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ABSTRACT

An increasingly important consideration in drug abuse policy and programming is the growing number of multiple substance abusers, i.e., problem-drinking drug addicts. A longitudinal study of two drug addict populations examined drug and alcohol usage, psychological variables, and criminal justice and employment indicators. Findings indicated that alcohol abuse was a highly meaningful and clinically useful indicator of pervasive problems and special treatment needs of drug clients. Poor treatment outcome was most strongly associated with problem drinking at the time of follow-up. No increase in problem drinking existed among methadone clients. The strongest rehabilitative effects exhibited after a year of methadone maintenance included control of narcotic abuse and improved employment records. (JAC)

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National Institute on Drug Abuse

SERVICES RESEARCH REPORT

The Problem-Drinking Drug Addict

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FOREWORD

An increasingly important consideration in drug abuse policy and programing is the extent of multiple substance abuse as reported in the literature. Studies of both nontreatment populations (e.g., Abelson and Atkinson 1975; Abelson and Fishburn 1976; Johnson 1976; O'Donnell 1976) and treatment populations (e.g., Simpson and Sells 1974; NIDA National Drug/Alcohol Collaborative Project Final Report 1977; Bourne 1974) reflect the scope and problems inherent in multiple substance usage, i.e., use of two or more psychoactive agents in concurrent, sequential, or alternating patterns.

This report, The Problem-Drinking Drug Addict, emphasizes the importance of examining a drug abuser's alcohol history, over the individual's lifetime and most recent past. This is seen as of consequence for a number of reasons. First, physiologically it is significant to know the impact of alcohol by itself or in combination with drugs because of the additive, and potentially deleterious, effects of taking alcohol together with other substances. Second, knowledge of alcohol habits may be important in actual treatment planning. Direct intervention and/or supervision with a client may necessitate, for example, a controlled drinking or an abstinence model for dealing with the client's drinking problem in concert with the drug problem. A drug abuser with a considerable alcohol problem may be inappropriate for certain treatment interventions and appropriate only for other interventions. Third, it may be important to be aware of current as well as past alcohol consumption in order to be able to predict and take into account the potential for later alcohol use and/or other treatment outcomes.

Two different treatment populations are examined in this report which is designed to explore the use of alcohol among drug abusers in treatment. One sample is drawn from a treatment population at the Eagleville Hospital and Rehabilitation Center in Eagleville, Pennsylvania. The second sample is drawn from 10 methadone maintenance treatment programs located in the greater Philadelphia area which agreed to participate in the research study. The data are presented for both groups for three time frames--lifetime, 2 months prior to admission, and at followup. Variables examined for their contribution to outcome included drug use, drug problems, alcohol consumption, alcohol problems, psychological variables, criminal justice, and employment indicators. There could be no direct comparison of treatment outcome between the two modalities because of differences in the nature of the populations.

In addition to examining changes over time in the two groups, and examining the relationship of alcohol variables to other criteria, the methodology developed for defining alcohol "abuse" is instructive. Both alcohol consumption and alcohol-related problems are operationalized as components of alcohol abuse and are measured separately as well as together. Based on variations in alcohol consumption, alcohol problems, and time frames, a typology is developed for classifying alcohol users.

The data that were collected during this study also allowed the investigators to examine the issue of alcohol abuse in methadone maintenance programs. There has been considerable concern shown in the literature as to whether methadone treatment itself is instrumental in precipitating or relieving alcohol problems (e.g., Gearing 1970; Simpson 1973; Bihari 1974).

In summary, this report provides a comprehensive examination of alcohol use by drug abusers in two modalities. In terms of both the findings and the processes and methodologies used during the study, there should be important implications for treatment planners, administrators, researchers, and clinical personnel. This research represents a continuing effort at the Federal level to examine treatment and policy issues that arise regarding combined substance abuse.

Stephen E. Gardner, D.S.W.
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Our deepest gratitude is to the 866 men and women whose willingness to share something of their experiences with us has added to our understanding of the people whose problems we try to help.

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The Problem-Drinking Drug Addict

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1. Goals and Design of the Study

INTRODUCTION

The major objective of this project was to systematically document and investigate the occurrence of alcohol abuse in drug addicts and its effect on their treatment and rehabilitation. The study investigated the appearance of problem drinking during and after drug abuse treatment.

A principal objective was to identify features of the pretreatment histories that can help predict (1) which drug addicts are most likely to abuse alcohol during and after treatment for drug abuse, (2) the extent to which alcohol abuse may interfere with that treatment, and (3) more broadly, we wished also to determine what factors ascertainable at intake can predict different aspects of outcome. We were therefore concerned with the drug addict's drinking history before he or she entered treatment (including the part played by alcohol in the person's lifetime substance abuse history) and the drinking pattern at the time of admission to treatment, as well as its course during and after treatment.

This project provides a data important for our understanding of two issues of national importance. One is the problem of alcohol abuse by methadone maintenance patients, viewed by many (e.g., Maddox and Elliott 1975; Bihari 1974) as a major cause of treatment failure in that modality. How widespread is problem drinking by methadone patients? Is it in some way created by methadone, at least in some patients? Can we identify patients whose alcohol histories make them poor risks for this modality?

The second issue is that of multiple substance abuse, both concurrent and sequential, a phenomenon whose existence has only recently been widely recognized. What are the characteristics of those with unstable or mixed patterns of abuse, and what do such patterns mean for treatment? By focusing on alcohol, where most other studies of drug abusers have excluded it, and by obtaining detailed information about the use of all substances of abuse and their meaning to the person, this project helps to fill a serious gap in our knowledge--the intersection of alcohol and other substances in the lives of substance abusers.

We were interested also in whether these phenomena differed in any way as a function of treatment modality. Subjects were therefore drawn from two major treatment modalities and compared in certain analyses of the data. Two-thirds of the subjects were new admissions to outpatient methadone maintenance programs in the Greater Philadelphia area,

while one-third were new admissions to the Inpatient Program of Eagleville Hospital and Rehabilitation Center, which is an abstinence residential program with a therapeutic community orientation, treating alcohol and drug patients in a combined program and serving the same geographic area.

A special strength of the study design is that it was prospective. That is, each subject was taken into the study shortly after admission to treatment and followed for at least one year thereafter. Thus, the exploration of relationships between pretreatment history and followup status do not depend on the subject's report at the time of followup, but are rather based on data collected a year earlier.

DESCRIPTION OF TREATMENT MODALITIES

The Methadone Programs

The subjects were drawn from 10 cooperating methadone maintenance programs.[1] Six were in the city of Philadelphia, two in adjacent counties of Pennsylvania, and two in adjacent cities in New Jersey. There was some variety in the services offered, but certain general features can be described. None provided combined treatment of drug and alcohol clients, their services being limited to narcotic addicts. The major form of therapy was the methadone itself, combined with an individual counseling session once a week. Only a small percent of the clients received other services: 13 percent had group therapy, usually once a week, 7 percent had family therapy, and 10 percent some form of vocational counseling or rehabilitation. Medical treatment and drop-in recreational facilities were offered by some programs as well.

At the 1-year followup, 31 percent had remained in their original methadone program, 26 percent had been discharged and readmitted to methadone maintenance at the same clinic or elsewhere, 6 percent were in other forms of treatment, and 37 percent were no longer on methadone maintenance.

Eagleville Hospital and Rehabilitation Center (EHRC)

Eagleville Hospital and Rehabilitation Center (EHRC) considers itself a therapeutic community (TC), but it differs in significant ways from many other TCs. It is a fully accredited hospital, and the staff includes both recovered drug and alcohol addicts (and others) whose training has not been through traditional academic routes as well as professionals with traditional training. It is a residential abstinence program, treating drug and alcohol abusers in combined treatment. Thus, while the Eagleville program is in sharp contrast to methadone maintenance programs, caution is necessary in generalizing these findings to other TCs, both because of its special features and the fact that only one residential program was sampled.

The Eagleville Inpatient Program is an intensive, multimodality 2-month program, located in a rural setting 28 miles outside of Philadelphia. Of those who complete the inpatient phase, many remain on the hospital grounds for a transitional program for periods up to 6 months more, known as the Candidate Program. Of the EHRC sample, 22 percent completed the Inpatient Program and continued into the Candidate Program, 31 percent completed the Inpatient Program and left residential treatment (in many cases continuing in outpatient aftercare), and 47 percent left against medical advice, eloped, or were given disciplinary discharges.

All residents have at least four group sessions a week and individual sessions as needed, usually one to three times a week. There are regular community and unit meetings, activities, and occupational and work therapy programs. In this sample, 6 percent received family therapy and 21 percent vocational rehabilitation.

SUBJECTS

The study sample consisted of 866 drug addicts, taken at the point of entering treatment: 586 entering outpatient methadone maintenance, and 280 admitted to the EHRC Inpatient Program. In addition, intake interviews were obtained from a sample of 243 alcoholics admitted to EHRC, primarily to establish criteria for the definition of alcohol abuse in the drug addicts, and secondarily in order to examine the drug abuse histories of alcoholics.

The design was to recruit from each participating program all successive admissions who were willing to give their informed consent. While the refusal rate was low, some subjects were missed because they left treatment within a few days, or because they could not be contacted within 2 weeks after admission, which was the time limit for the intake interviews.

Demographic, social background, and substance abuse data have been compared with the reports of the Central Medical Intake of Philadelphia. This comparison showed the study sample to be representative of all drug

addicts referred for treatment in the Philadelphia area.

Characteristics of the Total Sample

The sample was heterogeneous in sex, age, and race; 27 percent were women, the median age was 26 years with a range from 17 to 60, and 63 percent were black, with Italian, Irish, and German ethnic backgrounds most frequent among the whites (less than 2 percent were Hispanic). Sixty percent did not complete high school and only 11 percent had gone beyond high school; 71 percent described themselves as dropouts from the last school they attended, 45 percent in the middle of the school year. They reported extensive histories of truancy, suspensions, and expulsions from school. Residential and marital instability were greatly evident.

In the 2 years prior to admission, the median number of months of employment was 6, while 31 percent did not work at all in that period. Sources of support at the time of intake to treatment (citing multiple sources) were welfare (50 percent), selling drugs (33 percent), other illegal sources (37 percent), family and friends (33 percent), and in fifth place, employment (20 percent). The major single sources of support were: 38 percent illegal, 25 percent welfare, 19 percent employment, and 18 percent various other means. The most common occupations were semiskilled or unskilled labor and service occupations.

Involvement with the criminal justice system was extensive. Most (87 percent) had been arrested, half the sample six or more times. Only 27 percent had never been convicted of a crime, and 39 percent had been convicted three or more times. Forty percent had spent more than a year in prison, 39 percent a year or less, and only 21 percent had not been in prison; 21 percent had spent time in a juvenile correction facility. The means were 8.4 arrests, 3.1 convictions, 29 months of incarceration. At the time of intake, 54 percent were on parole, probation, or under other legal constraint.

The circumstances of their childhoods were adverse in most cases. Only 47 percent were raised by both parents until the age of 12, 64 percent reported parental separation, divorce, or desertion, or a death in the immediate family by the time they were 12, 49 percent reported having gone without necessities because of poverty, and 40 percent reported violence in the home, including physical abuse of the respondent. Excessive drinking and other forms of psychopathology in the family were frequent. As for the respondents themselves, there was much evidence of psychopathology, the most extreme being that 11 percent had spent at least 2 weeks in a psychiatric hospital and that 30 percent had thought of suicide, 15 percent having actually attempted it.

While their substance abuse histories will be discussed elsewhere, we may note that, at the time of the intake interview, the average time since first use of any substance of abuse was 13 years; since first narcotic use, 8 years; and since first regular narcotic use, 7 years. Typically, alcohol was the substance used and abused first. In the 2 months before admission, 73 percent used more than one substance (including alcohol), and the mean number of different substances used was 3.1. Most (78 percent) had had some type of treatment for drug abuse before, either detoxification, residential, methadone maintenance, or other modalities, and in many cases more than one modality.

Differences between the
Methadone and TC Samples

When compared with methadone subjects, those entering the residential abstinence TC (EHRC) were somewhat younger (mean 25.6 years versus 28.5), and had a more equal racial balance (42 percent black versus 72 percent). While 92 percent of the methadone patients were living in the community before entering treatment, only 42 percent of the EHRC patients were (31 percent from prison, 24 percent from hospitals or residential drug programs, 3 percent other).

As measured by their educational and criminal justice histories, by their report of family psychopathology, and by their psychological instability. They began using drugs at a younger age (mean of 14.2 years versus 17.0); however, the average interval between first drug use and entrance to treatment was the same, 11 years.

In the TC, 69 percent stated that the primary problem for which they were in treatment was narcotics, while 31 percent gave another drug (most often amphetamines) as their first problem. As expected, all methadone subjects gave a narcotic drug as their first problem. Most of the narcotic addicts in both the TC and methadone programs abused other substances as well as narcotics, and many of the "polydrug" patients used narcotics as well as other drugs. The greater social and psychological instability of the TC subjects suggests that they included a larger proportion of those types of addicts who are most in need of the kind of support and separation from the community that this modality has to offer.

METHOD

As has been noted, the greatest methodological asset of this study is that it was a prospective study of the impact of treatment on the drug addict. That is, each subject was interviewed extensively at the time of admission to treatment in order to provide data about pretreatment history and status at the time of beginning treatment (intake interview). He or she was then reinterviewed a year later (followup interview).[3] The information provided by a subject in the intake interview of his or her earlier history is, of course, susceptible to many sources of distortion in recall or reporting. It must therefore be borne in mind that, although we may refer to such data as if it represented the facts objectively, this is done merely to simplify the presentation. A subject may report that his childhood was unhappy; we cannot know whether it was experienced as such at the time. Nevertheless, the intake interview represents the kind of information that is available to the clinician when a client presents himself for treatment.

Instruments and Data Obtained

The largest source of data was derived from interviews. All subjects received a comprehensive intake interview covering demographic data, educational and military history, employment, family, criminal justice involvement, attitudes, values, expectations from treatment, emotional state, and self-image. A very thorough substance-abuse history was obtained, including motivations for the use of drugs and alcohol, and both good and bad effects reportedly experienced from the use of various substances. The 12-month followup interview covered the same areas as well as the experience in treatment and the respondent's view of it, and significant events in the person's life during the year.

In addition to the interviews with the subjects, the following data were obtained: urine testing for drug and alcohol use during the early stages of treatment and at each followup interview,[4] and periodic reports by counselors of each subject's progress as long as he or she remained in treatment. Information from treatment program records about dates and types of discharges, as well as readmissions and transfers was also obtained. For the comparison sample of alcoholics, only the intake interview and treatment program data were obtained.

Procedure and Followup Completion Rates

All interviews were conducted by research staff interviewers, trained and supervised by the project professional staff in the administration of lengthy and complex interview schedules. Interviewers were stationed at the participating treatment programs, where all intake interviews were conducted. While the initial plan was to try to recruit all successive admissions to each program during a certain time period, not all subjects could be contacted during the 2 weeks after admission to treatment, the time limit set for intake interviews. This was more true of the methadone clients than of the EHRC residents, since the rate of admissions in each methadone clinic was much less than at EHRC. As a result, interviewing staff in the methadone programs were more scattered geographically.

Subjects in methadone clinics were paid $10 per interview; EHRC subjects were not paid for intake interviews, but were paid for followup interviews since they were no longer in residence at that time. The refusal rate of potential clients who were contacted was very low. Insofar as there was a systematic bias in the recruitment of subjects it was to underrepresent clients who left treatment within the first 2 weeks. Of the intake interviews obtained, several were unusable because of language difficulties, and one or two were incoherent, apparently because of a psychotic state.

All subjects for whom a valid intake interview was obtained were then sought for followup. The importance of a high rate of successful followup cannot be overemphasized. Studies that fall far short of 100 percent location of subjects introduce a bias that seriously limits the validity of interpretation from the data.

Special emphasis was therefore put in this study on finding respondents for the 12-month interview. Some were easy to find. One hundred ninety-seven of the methadone sample were still in treatment at the same clinics. Interviewers were sent as far as 200 miles away, 106 interviews were conducted in prisons, and a few interviews of respondents as far away as California were conducted by telephone. While the goal was to conduct followup interviews 12 months after intake, this was not always possible. Elapsed time ranged from 11 to 25 months; 73.8 percent of the interviews were completed by 13 months, 88.7 percent by 15 months, and 95.5 percent by 18 months after intake. Table 1 shows the results of these followup efforts.

TABLE 1.—Followup rates for 12-month interview

	EHRC		METHADONE		ALL CASES	
	No.	%	No.	%	No.	%
Interviewed	242	86.4	525*	89.6	767*	88.6
Deceased	4	1.4	12	2.0	16	1.8
Contacted and refused	6	2.1	6	1.0	12	1.4
Not contacted	28	10.0	43	7.3	71	8.2
Total	280	100.0	586	100.0	866	100.0
Successful followup= interview + deceased	246	87.9	537	91.6	783	90.4

*Three of these cases are not included in subsequent analyses; one was received too late, and two were lost in the course of data editing and keypunching.

The rate of successful followup was considered to be very high. The slightly (but not significantly) higher rate for the methadone sample is due to the fact that so many were still in treatment; 99.5 percent of those still at the initial clinic were interviewed in contrast to 83.8 percent of those who had been discharged. Those not interviewed were compared with those interviewed on the major intake variables. The interviewed and non-interviewed subjects did not differ significantly on any of these measures, suggesting that no major bias was introduced by the failure to interview all cases.

ISSUES AND QUESTIONS

The remainder of this report addresses issues stemming from the basic objective of investigating alcohol abuse in drug addicts and its implications for their treatment and rehabilitation.

1. The first issue is that of the prevalence of alcohol abuse among the set of individuals identified primarily as drug abusers. How many show evidence of a significant level of alcohol abuse at any given time? How many drug abusers have a history of alcohol abuse, whether currently or not? A subordinate but related issue, at least within the framework of this study, is that of the prevalence of drug abuse among those identified as alcoholics.

2. If there are, in fact, a substantial number of drug abusers with a history of alcohol abuse, it would be important to determine whether they differ from drug abusers with no alcohol abuse history in such areas as early histories, demographic features, or psychological statuses. At the time they enter treatment, is there evidence (other than their drinking histories) that they are a special kind of patient, with special needs for treatment and rehabilitation? Again, the same questions may be asked about the alcoholic with a history of drug abuse, broadening the issue to that of multiple substance abuse without regard to which substance is seen as the primary problem at a given moment.

3. The primary focus of the study was to determine how knowledge obtained at intake enables us to understand and predict what happens after treatment begins and once treatment ends. The expectation is that alcohol abuse has an adverse effect on treatment outcome. While it is not possible to establish causation within such a study, the degree of association between alcohol abuse and poor treatment outcome will be explored, both concurrently and over the course of time. Three broad questions are asked of the data.

   (a) The first question has to do with the relationship between alcohol abuse observed after admission to treatment, at the time of followup, and other aspects of the person's behavior and condition at the same time. Are those subjects who are abusing alcohol at intake and at the time of followup likely

to have poorer outcomes in other respects, such as drug abuse, employment, involvement with the criminal justice system, and psychological status?

(b) The second question is concerned with relationships over time. Is a history of alcohol abuse prior to the time that a drug abuser enters treatment for his or her drug problem associated with a greater likelihood of alcohol abuse at the time of followup, as well as with less successful outcome status in regard to drug abuse, employment, involvement with the criminal justice system, and psychological status? Although we can not establish that pretreatment alcohol abuses cause later treatment failure, can it help to identify potential failure and those in need of special treatment planning?

(c) Beyond our primary concern with the implications of alcohol abuse, we are interested in finding out to what extent different aspects of outcome can be predicted from an intake interview, as well as in determining just which items of information obtained at the point of intake can best predict each aspect of outcome. The analyses dealing with this issue must be considered exploratory, and no hypotheses are advanced concerning them.

4. Since the subjects of this study were drawn from two very different modalities, it is tempting to speculate about differences between modalities in treatment effectiveness, either overall or for special types of clients. Valid direct comparisons cannot be made, however, since clients involved in the study were not assigned to treatment programs randomly, and since the two types of treatment programs differ in very significant ways.

   While direct comparisons will therefore not be made between the followup status of the methadone and EHRC subjects, certain of the findings will be presented separately for the two treatment groups, whenever there are differences between them that are interesting and informative. Interpretation of these differences, however, must be made with caution.

5. Finally, an important question on which the data can shed some light is in regard to alcohol abuse by methadone clients, in particular, whether there is evidence that the abusive drinking seen among methadone clients can be attributed to the effects of methadone itself.

2. Definitions, Measures, and Hypotheses

DRINKING BEHAVIOR AND HISTORY

The criteria for the diagnosis of alcohol abuse include both high levels of alcohol consumption and adverse effects on the person's life from that consumption. The adverse effects may be seen in various areas of functioning: health, employment, psychological status, interpersonal relationships, illegal or otherwise socially disapproved behavior. In addition, loss of control over drinking is a classic behavioral sign. A related but somewhat distinguishable set of signs is concerned with the psychological or motivational basis for drinking--the extent to which alcohol is used to relieve anxiety and tension, to forget problems, to feel better able to cope with social situations.

These three major aspects of a person's drinking behavior and their implications were measured in this study; two of them were used as the basic criteria for the classification of drinking history patterns. The two variables used to classify subjects were "Alcohol Consumption" and "Alcohol-Related Problems"; the third variable that was examined was "Motivation for Alcohol Use."

Much of the thinking that went into the development of these drinking measures was stimulated by the work of Cahalan and his associates (Cahalan et al. 1969; Cahalan 1970), and many of the items were borrowed from their work. Our measure of Alcohol-Related Problems corresponds to their Symptomatic Drinking score, while our measure of Motivation for Alcohol Use corresponds to their measure of Psychological Dependence.

Alcohol Consumption

In both the intake and followup interviews, subjects were asked "Did you drink any whiskey, gin, or other hard liquor in the last 2 months?" If the answer was "yes," the subject was then asked "How frequently did you drink?" and "What was the amount on a typical day when you were drinking?" These questions were then repeated in regard to wine and beer. The average daily consumption of alcohol during the preceding 2-month period was then determined by multiplying the frequency (e.g., 1.00 for daily drinking, .14 for once a week) by the number of ounces

per occasion and by the percentage of alcohol in the beverage in question (.45 for liquor, .15 for wine, and .06 for beer). The resulting quantities for each beverage were then summed to obtain the total alcohol consumption on an average day in the 2-month period in question.

In addition, on the intake interview, subjects were asked "Was there ever a time when you drank more than you do now?" If the answer was "yes," the interviewer then said "Think back to the time when your drinking was the most it has ever been: At that time, how often did you drink each of the following, and how much did you drink on a typical day when you were drinking?" Responses for liquor, wine, and beer were then computed and summed in the same manner to yield a measure of the person's lifetime maximal level of alcohol consumption.

The distribution of the resulting scores was extremely positively skewed, even when total abstainers are ignored. Because the means were much higher than the medians, the presence of a few extreme cases, particularly in a small subgroup, could unduly distort the picture.

A logarithmic transformation was therefore applied to all alcohol consumption scores greater than zero.[1] The resulting scores were then grouped to form an index, with scores ranging from 0 to 12. A zero score was given to subjects reporting no consumption of alcohol; for the other categories, successive intervals correspond to a logarithmic difference of .30, or a ratio of 2. In other words, subjects in each category reported twice as much alcohol consumption as those in the preceding category.

The effect of the transformation of scores was to provide more nearly normal distributions, satisfying the requirements of the statistical procedures used and, in particular, minimizing the distorting effect of a few extreme scores. For ease of comprehension, all alcohol consumption data reported here has been converted back to the equivalent in ounces of 90-proof whiskey. It should be noted, however, that the effect of the score transformation is to produce geometric, rather than algebraic, means.

Three measures of average daily alcohol consumption were thus derived: lifetime maximum, on admission to treatment, and at time of followup. It should be pointed out that the use of a strictly quantitative measure of alcohol consumption does not give special weight to binge drinking, i.e., very high consumption on a less than daily basis. Cahalan's method of classifying alcohol intake does give extra weight to high levels on a less frequent basis. One hundred cases were classified by both methods, and several that were classified as heavy drinkers by his criteria were not by ours. Nevertheless, we decided to use the strictly quantitative measure because of its advantages for statistical manipulation, with the understanding that it fails to identify a certain number of binge drinkers.

Alcohol- and Drug-Related Problems

In the intake interview a set of 51 items was asked each subject about his or her drug use. It consisted of 13 items about drug-using behavior, 14 items about bad reactions to drugs or to withdrawal, 14 items about positive effects experienced from drugs, and 11 items about the adverse effects of drug use in the person's life. Following this, the same items were asked in regard to alcohol use (with the addition of an item about delerium tremens). The subject was first asked whether each effect had ever been experienced in relation to alcohol. For items that were answered affirmatively, the interviewer then asked whether it had been experienced within the last 2 months. The same set of questions was repeated in the followup interview, first in relation to drug use, and then the entire list repeated in relation to drinking.

Thus, the same set of questions (with the deletion of the item about delerium tremens in relation to drugs) was asked within five distinct frames of reference: at intake in relation to lifetime drug use[2] and lifetime alcohol use, in relation to current alcohol use, on followup in relation to current drug use and to current alcohol use.

Four parallel factor analyses were performed on these items, together with an additional 13 items about motivations for drug and alcohol use (described below). Twelve subscales were derived in this way; the procedure and the item content of the scales are presented in the appendix.

Certain of the subscales were very highly intercorrelated, although logically and statistically distinguishable. One set clustered to form a broader scale of "Bad Reactions," and another set clustered to form a scale of "Life Consequences." These two scales, together with a four-item scale of "Loss of Control" and the response to the item "How many times have you stayed intoxicated for a full day or more (ever; in the last 2 months)?" had an average intercorrelation of .70 for the lifetime history, and .68 for the 2 months prior to intake. They were therefore combined,

recoding the raw scores for each scale so as to give the four components equal weight.[3] The resulting scale is the Alcohol Problems score; its components, with the recoding, are shown graphically in figure 1. Three Alcohol Problems scores were obtained for each subject: "Lifetime Alcohol Problems (pretreatment)," "Current Alcohol Problems (at intake)," and "Followup Alcohol Problems."

Drug-related problems were assessed in the same way, using a different recoding because of the piling up of all drug-related scores in the intake interview at the high end of the scale, and without a component analogous to the intoxication item for drinking. The two scores that were obtained were "Lifetime Drug Problems (pretreatment)" and "Followup Drug Problems."

Motivations for Alcohol and Drug Use

The 13 items concerned with motivations for drug or alcohol use were introduced by "Here are some statements people have made about why they take drugs (drink beer, wine, or liquor). Think about each statement and tell me how important each of the following is to you as a reason for taking drugs (drinking)." The response options were: "very important," "fairly important," "not at all important," or "does not apply" (the last for nondrinkers only). All 13 items were first asked with regard to drugs, and then repeated with regard to alcohol.

Four of these items clustered into a scale of "Social Reasons for Drinking/Using," which preliminary analysis indicated was of little utility for the issues under investigation. Four of the "reasons for drinking/ using" items, together with 10 of the items previously cited describing positive effects experienced from drinking or using, fell into three highly intercorrelated subscales. These scales were combined, with the addition of two motivational items and two positive effect items that were related to the subscales generally but to none specifically. The resulting 18-item scale is called "Motivations for Use"; its content is given in the appendix. Four frames of reference were scored: Motivations for Alcohol Use, pretreatment and on followup, and Motivations for Drug Use, pretreatment and on followup.

The Motivations for Use Scales form a logical contrast to the Problems Scales. While the latter represent loss of control and the negative effects of substance use, the Motivation for Use Scales describe the subject's perceived benefits from and positive motivations for substance use. Typical items are: drinking helps you to forget your worries and troubles; makes you feel happy, calm, relaxed; provides relief from pain, anxiety, and tension; helps you to have fun, relate better to people, overcome shyness, and relax socially; helps you to be more alert mentally and express your ideas and opinions. The distinction is that the Problems Scales measure what drinking (or drug-taking) does to you, while the Motivation for Use Scales measure what drinking (or drug-taking) does for you.

Logical though this distinction may be, it did not hold up in practice. Each of the Motivation for Use scores was highly correlated with the corresponding Problems score[4] and had a similar pattern of correlation with other measures as well. Thus, the person for whom a chemical substance is very important as a way of solving life's problems and meeting psychological needs is very likely to be in trouble with that substance.

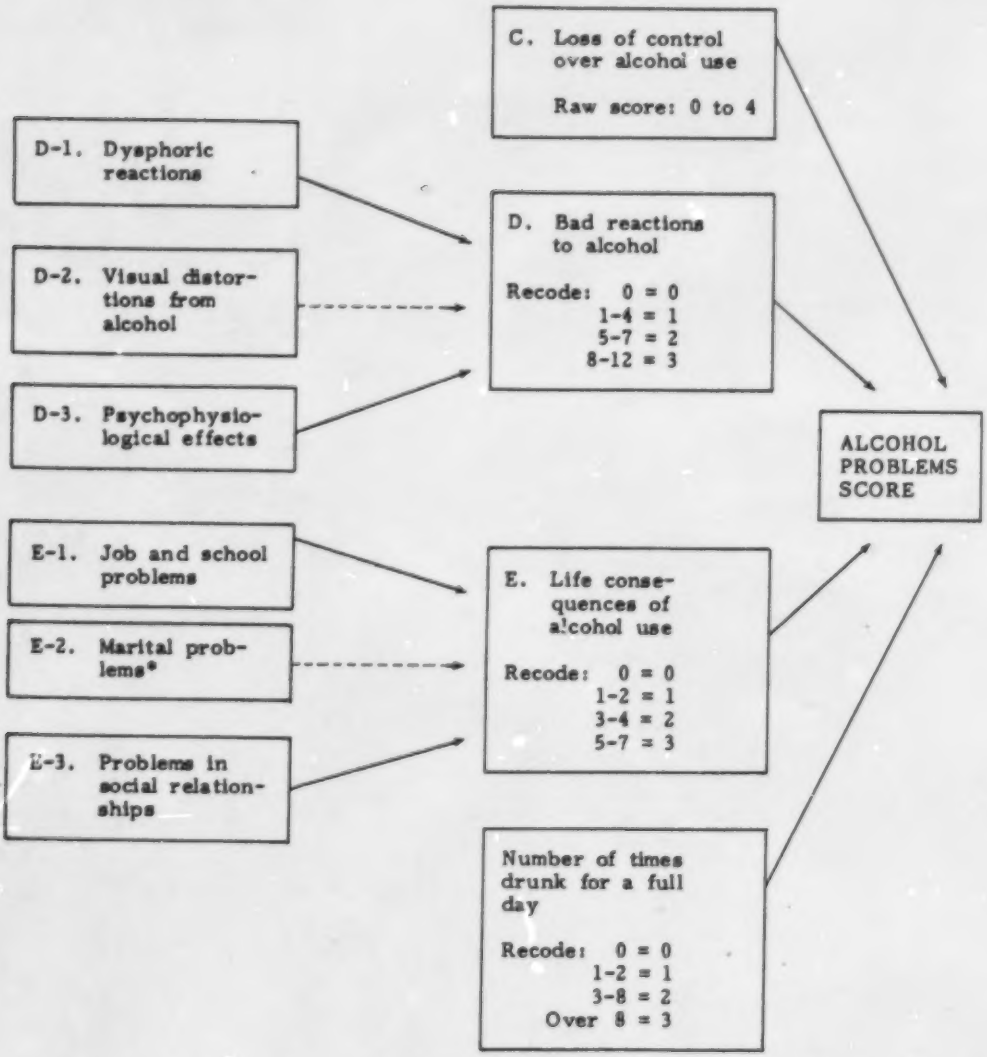
Although all of the analyses of data were performed for the Motivation for Use scores as well as for the Problems scores, the findings essentially duplicated each other. Results are therefore presented for the Problems scores only.

Criteria for Classifying
Alcohol Use and Abuse Patterns

We wished to develop criteria for identifying patterns of alcohol use that can justifiably be considered to represent alcohol abuse. The sample of residents admitted to EHRC for the treatment of alcoholism was used as the reference group for selecting the criteria for alcohol abuse.[5] At the other extreme, Cahalan's published studies of drinking behavior in samples of the general population were compared with our data. These comparisons showed that, while the total drug addict sample did not equal the alcoholics in their levels of alcohol consumption and problems, both their consumption and alcohol-related problems were greatly in excess of those reported by Cahalan's general population samples (Barr et al. 1974). These differences must be interpreted cautiously, however, since our samples were not matched with Cahalan's on demographic characteristics. Large differences remained when our sample was compared with appropriate breakdowns of his data by race, economic level, and region of the U.S.

The criteria for the classification of "problem drinkers" and "heavy drinkers" were based on the distributions of the Alcohol Consumption and Alcohol Problems Scores in the sample of alcoholics. That is, the cutoff points for classifying scores as "high" were placed at the lower end of the range of scores reported by the alcoholics. It should be

FIGURE 1.—Composition of the Alcohol Problem Score


C. Loss of control over alcohol use
Raw score: 0 to 4
D-1. Dysphoric reactions
D-2. Visual distortions from alcohol
D-3. Psychophysiological effects
D. Bad reactions to alcohol
Recode: 0 = 0
1-4 = 1
5-7 = 2
8-12 = 3
ALCOHOL PROBLEMS SCORE
E-1. Job and school problems
E-2. Marital problems*
E-3. Problems in social relationships
E. Life consequences of alcohol use
Recode: 0 = 0
1-2 = 1
3-4 = 2
5-7 = 3
Number of times drunk for a full day
Recode: 0 = 0
1-2 = 1
3-8 = 2
Over 8 = 3

*This scale was omitted from the Alcohol Problems Score because it applied to less than one-half the sample.

pointed out that this is a very stringent criterion, since the EHRC treatment population includes a larger proportion of those in advanced stages of alcoholism than would be found in most other residential alcoholism programs; very few have even partially intact working or family lives. The cutoff points that were used are:

(a) Alcohol Consumption. The cutoff point above which alcohol consumption reported in the intake interview was labelled "high" corresponds to 3.82 ounces average daily consumption of 90-proof whiskey. When we apply this criterion to the lifetime maximum alcohol consumption, virtually all of the alcoholics fell above the cutoff point by definition, averaging 36.62 ounces of whiskey daily or the equivalent in other alcoholic beverages. The drug addicts whose lifetime maximum consumption was above the cutoff point averaged 17.56 ounces of whiskey or the equivalent. (These means would have been much higher if the logarithmic transfor-mation had not been used--67.33 ounces of whiskey for alcoholics, and 25.59 ounces for drug addicts in the high score range.) Thus, although the cutoff point may not seem very high, those above it had, on the average, consumed large quantities of alcohol. By comparison, the drug addicts who reported some drinking (i.e., who were not abstainers) but below the cutoff point for high consumption, had a lifetime maximum of 0.68 ounces of whiskey daily.

(b) Alcohol-Related Problems. The cutoff point for a high Alcohol Problems Score was 5 or more of a possible 13 points. The mean for alcoholics above this point (again, virtually all, by definition) was 10.0, and for drug addicts above the cutoff point the mean score was 8.1.

Having described the measures to be used to characterize the drinking histories of our subjects, and the criteria for classifying scores as high, we can now proceed to define the terms that will be used in the remainder of this report to describe the drinking histories of our subjects.

DEFINITIONS OF TERMS

The terms used to characterize patterns of alcohol use and abuse are:

Problem Drinker: A problem drinker is defined as one who has a high Alcohol Problems Score (5 or more). The overwhelming majority of problem drinkers are also "heavy drinkers," but this need not be the case.

Heavy Drinker: A heavy drinker is defined as one with a high level of alcohol consumption (averaging above 3.82 ounces of 90-proof whiskey daily). A heavy drinker may or may not describe himself as a problem drinker.

Moderate Drinker: A moderate drinker is one who reports some consumption of alcohol, but at a level below that classed as heavy drinking (averaging below 3.82 ounces daily). A moderate drinker is unlikely to report a high level of alcohol problems, but he may.

Abstainer: Abstainers are those who report no alcohol consumption. It should be noted at this point that no distinction will be made in the analysis of data between moderate drinkers and abstainers; that is, comparisons based on alcohol consumption are only made between heavy drinkers and those who are not heavy drinkers, since our primary concern is with alcohol abuse.

Each of these terms will be used to characterize the drinking behavior of subjects with reference to the different time frames reported, i.e., lifetime, current as of intake, and at followup. The drinking history obtained in the intake interview will be identified as past or current.

Current problem drinking refers to a high Current Problems Score (within 2 months of admission). Current heavy drinking refers to a high level of alcohol consumption reported for the 2-month period prior to admission.

A past problem drinker is one with a high Lifetime Alcohol Problems Score, but not a high Current Problems Score. A past heavy drinker is one who reports a high lifetime maximum level of alcohol consumption, but not a high level in the 2 months prior to admission.

NONDRINKING OUTCOME MEASURES AND THEIR PRETREATMENT COVARIATES

In addition to alcohol consumption and alcohol problems, four other major domains of functioning were studied: drug use and drug-related problems; psychological status; involvement with the criminal justice system; and employment. Each of these areas was assessed at intake as well, so that pretreatment status could be taken into account.

The use of parallel intake and followup measures makes it possible to (a) assess change during the year since entrance to treatment

and (b) to obtain a "purified" measure of change during the postintake year, using covariance techniques to partial out the effect of pretreatment status in a given area on relationships between status on followup in that area and other measures.

Drug Use

On both the intake and followup interviews, subjects were asked how often they had used each of a list of 14 substances during the preceding 2 months. Six drug categories were used in the analyses: narcotics (combining the categories of heroin, illegal methadone, and other opiates and synthetics), sedatives (including barbiturates and methaqualone), cocaine, amphetamines (including other stimulants), marihuana (including hashish), and tranquilizers (i.e., the so-called "minor" tranquilizers, such as chlordiazepoxide (Librium) and diazepam (Valium).[7]

For the intake data, two additional variables were created to summarize the degree of drug use. "Number used" is the number of drug categories in which any use occurred during the 2-month period before intake. "Number used regularly" is the number of categories used more than occasionally, defined as at least once a week for narcotics, sedatives, marihuana, and tranquilizers, and at least twice a month for amphetamines and cocaine. Greater weight was given to daily use in the measures of frequency of use of each of the six drug categories, and these measures were analyzed as well.

DEVELOPMENT OF A DRUG USE INDEX

Since a large number of statistical analyses were conducted for each outcome measure, a comprehensive Drug Use Index was felt to be useful. The particular way in which drug categories were combined and the weights assigned to them are inevitably somewhat arbitrary, and a case could be made for a differently constructed index. The present one has provide useful, however, for a general screening of relationships. Where a significant relationship with the Drug Use Index is reported, the particular drug category or categories responsible for the relationship will be noted.

The most commonly used drug on followup, other than alcohol, was marihuana, followed by narcotics. Sedatives, tranquilizers, amphetamines, and cocaine were each used appreciably less often, although their combined use approached that of narcotics. Accordingly, the first step in constructing the index was to develop a measure for the combined use of sedatives, tranquilizers, amphetamines, and cocaine, taking into account the total frequency of use of any of the four types of drugs. From this was derived a measure of the use of "other drugs" (i.e., other than narcotics and marihuana). If all use was reported as by prescription, it was not counted in the index. Regular use of "other" drugs was given 4 points, and irregular use received 2 points. Marihuana use was not counted if the person received a score for the use of uppers and downers, but, if he or she reported no illicit (nonprescribed) use of "other" drugs, then 2 points was given for regular marihuana use and 1 point for irregular use. Thus, the use of nonnarcotic drugs could be scored as 0, 1, 2, or 4. Added to this was a score of 2 points for regular narcotic use and 1 point for irregular narcotic use, yielding a score with a range from 0 to 6.[8]

A reasonable objection might be raised that narcotic use should have been given greater weight in the Drug Use Index. It is of interest, therefore, that when the index is correlated with its components, the highest correlation is nevertheless with narcotic use. The correlation coefficients of the Drug Use Index with the component drug categories on followup are, in order of magnitude: with narcotics, .653; with amphetamines, .556; with marihuana, .551; with tranquilizers, .494; with sedatives, .367; and with cocaine, .279. The average interrelation of the categories with each other is .197.

Drug Problems

The Drug Problems Score is directly analogous to the Alcohol Problems Score, based on all but one of the same items, and has already been described. It was scored in the same way on the intake interview (for Lifetime Drug Problems) and the followup interview.

Psychological Status

Psychological status was assessed in both interviews by a set of 52 questions. Twenty-eight were about feelings and emotions, and 24 were framed as self-image items (i.e., "How much like you is the kind of person who...."). A factor analysis was performed, yielding 8 scales that used 37 of the items. The scales included from two to seven items, and their reliability coefficient (based on mean item intercorrelations, using the Spearman-Brown formula) ranged from .505 to .781. Three of the scales consisted entirely of self-image items: "sociability," "dependence on others," and "ability to cope." A scale labelled "resistance to authority" consisted of two items from each list. The

remaining four scales consisted entirely of items concerned with feelings: "depression," "mistrust," "phobic anxiety," and "happiness."

Preliminary analyses showed that the three scales of depression, phobic anxiety, and happiness were intercorrelated and had similar patterns of correlation with other measures. Accordingly, they were combined to form a single 18-item scale labelled Dysphoria, measured in the same way on intake and followup. Its reliability coefficient was .848. The possible range of scores is from 0 to 72; the actual range was from 1 to 60.

The questions were introduced by the statement "I am going to ask you some questions about different feelings you may have had in the last 2 months. For each of them, I would like you to tell me how often you have felt that way, that is, have you felt that way all of the time, most of the time, fairly often, once in a while, or never?" Thus, each item was scored from 0 (never) to 4 (all of the time).

The six items in the Depression scale were: feeling bad or worthless; blaming yourself when things went wrong; feeling that nothing turns out the way you want it to; having had trouble getting started on the things you have to do; feeling unhappy, depressed, blue; and feeling weak, tired, or worn out.

The seven items in the Phobic Anxiety scale were: feeling people were trying to pick quarrels or start arguments with you; frightening dreams; afraid of being left alone, abandoned, or losing someone important to you; afraid of any particular thing, such as crowds, heights, or animals, even though you knew that there was no real danger; attacks of sudden fear or panic; feeling apart and alone even among friends; and feeling different from other people. In addition to the phobic element, there is a paranoid tinge to some of these items.

The scoring was reversed for the five items expressing Happiness, with "never" scored as 4 and "all of the time" scored as 0. The items were: feeling happy, cheerful, contented; feeling energetic and lively; feeling satisfied with yourself; feeling calm and relaxed; and enjoying being with other people.

Thus, a low score represents feeings of psychological well-being, while a high score represents feelings of ill-being, or dysphoria.

Involvement with the Criminal Justice System

Three highly correlated measures were combined to provide an index of involvement with the criminal justice system during the followup year: number of arrests, number of convictions, and amount of time spent in prison. These variables differ from the other outcome variables in that they do not represent daily, ongoing behavior, but are sporadic in their occurrence even in the life of a person to whom they have happened comparatively often. Furthermore, in the short run they may preclude each other. For example, if we were to look only at the 2 months prior to admission, a person who was in prison the entire time could therefore not have been arrested during that period.

It was therefore decided to represent each subject's pretreatment experience with the criminal justice system by his or her lifetime number of arrests, convictions, and number of months spent in jail, and to base the outcome measure on the entire year since intake. While this is necessary to provide an adequate time sampling, it makes direct pre-post comparisons impossible. It is possible, however, using covariance techniques, to say that the postadmission criminal justice involvement of one subgroup of subjects is greater or less than that of other subjects when preadmission history is taken into account, and it is also possible to make direct comparisons of the preadmission or postadmission histories of different subgroups.

For the year of followup, the Criminal Justice Index was computed as follows. For both number of arrests and number of convictions, none was scored as 0, one as 1, and two or more were given a score of 2; no time in prison was scored as 0, 1 to 30 days as 1, 31 to 180 days as 2, and 181 days or more as 3. The sum of these three components could thus range from 0 to 7.

Employment

Preadmission employment was measured by the number of months employed in the 2 years prior to admission to treatment. The outcome measure used was the number of months of employment in the year between intake and followup. Thus, a direct comparison is possible by dividing the pretreatment measure by two.

It should be noted that the conditions of treatment in the two types of programs sampled affect the possible length of employment. Since the EHRC Inpatient Program is a 2-month residential program, it is not possible for anyone who stayed in the program for at least a month to be credited with 12 months of employment. On the other hand, EHRC ex-residents who continued into the Candidate Program were counted as employed during that period, since Candidates are employed

by the hospital and pay for their room and board from their earnings. Adequate work performance is one of the conditions of their staying in the program, and the Candidate period was judged as valid a form of employment as the participation of a methadone client in a work training or vocational rehabilitation program.

THE ANALYSIS AND PRESENTATION OF DATA

The major variables used to assess followup status and the corresponding intake variables are summarized in table 2. These measures lend themselves to a variety of statistical approaches. The measures may be treated as continuous variables, and subjected to correlational methods, analysis of variance and covariance. They may also be categorized, and groups of subjects compared with each other.

A case in point is the issue of whether or not, in comparing the status of different subjects or groups of subjects on each outcome variable, the effect of pretreatment status on that variable should be controlled. If the portion of the variance in the outcome measure that is attributable to its correlation with the intake covariate is removed, the resulting residual score is a purified measure of outcome status, uncorrelated with intake status by definition. It is a cleaner measure of "treatment effect" than the raw outcome score would be, and measures only the variance across subjects not attributable to their pretreatment standing. It must be kept in mind

TABLE 2.—Major variables used in the analyses

Pretreatment Status and History	Status on Followup (Outcome Measures)*
Maximum Alcohol Consumption Current Alcohol Consumption	Followup Alcohol Consumption (2 months preinterview)
Lifetime Alcohol Problems Current Alcohol Problems	Followup Alcohol Problems (2 months preinterview)
Frequency of use of drug categories in 2 months preadmission Number of drugs used regularly; number of drugs used in 2 months preadmission	Followup Drug Use (2 months preinterview)
Lifetime Drug Problems	Followup Drug Problems (2 months preinterview)
Dysphoria (2 months preadmission)	Followup Dysphoria (2 months preinterview)
Lifetime arrests, convictions, and time spent in prison	Followup Criminal Justice Index (for entire year since intake)
Months employed, 2 years preadmission Employment Status, 2 months preadmission	Followup Months Employed (for entire year since intake)

*For the sake of simplicity and literary style, the term "followup" will be omitted in discussing these measures wherever it is evident from the context that outcome measures are referred to.

that the remaining variance is not necessarily the result of treatment, since it reflects the effect of other events or experiences that have impinged on the person in the intervening year, as well as "random" or unexplained sources of variance.

An example may clarify the issue. The r between intake and followup dysphoria scores is .399; thus, the level of dysphoria at intake accounts for 15.9 percent (i.e., r^2) of the variance among subjects in dysphoria on followup. If this variance is removed by analysis of covariance or by the use of residual scores, two subjects with the same responses on followup will be assessed differently. If both have an average score on followup, the one who was previously very dysphoric will be assessed as less so on followup, when compared with the one who had reported little dysphoria on intake.

For some purposes this is useful and appropriate, particularly when the goal is to learn how much predictive power a different variable, such as problem drinking, can add to the predictive power of the preadmission status on the same variable as that being assessed at outcome.

The covariance score, however, no longer has the direct meaning that the raw score has. Furthermore, in practice, when we have to deal with an individual, we are likely to be more interested in being able to predict, for example, how likely the addict with a history of problem drinking is to be dysphoric later on, than we are in purifying that prediction by the elimination of the role of pretreatment dysphoria.

Size of the Sample in the Data Analyses

The data reported in chapter 3 are based entirely on the intake interview, and so include the full sample of 866 drug addicts (280 EHRC subjects and 586 methadone subjects). All subsequent analyses, however, are of outcome measures, and so are reduced by the 102 cases for whom followup data are not available (83 not followed, 16 deceased, and 3 cases not entered into the data base). They thus include 764 cases, consisting of 242 EHRC residents and 522 methadone clients.

In addition, four of the seven outcome measures are concerned with alcohol and drug use and associated problems. Subjects who are imprisoned are not free to drink or use drugs (although some apparently manage to do so). To include them in the analyses produces very misleading results, since someone who is abstinent because he is in prison is quite different from the person who is voluntarily abstinent. Accordingly, 106 subjects whose followup interviews were conducted in prison are removed from all data analyses involving the four substance use variables. The resulting sample of 658 cases includes 190 EHRC subjects and 468 methadone subjects.

HYPOTHESES

The following hypotheses were tested in this study:

Hypothesis I

Subjects who are abusing alcohol at the time of followup will have poorer outcome status than other subjects in regard to other aspects of functioning.

Prediction 1: Subjects who are problem drinkers at the time of followup will, when compared with other subjects, have at the same time

a. higher Drug Use scores,
b. higher Drug Problems scores,
c. higher Dysphoria scores,
d. higher Criminal Justice Index scores, and
e. fewer months of employment since intake.

Prediction 2: Subjects who are heavy drinkers but not problem drinkers at the time of followup will, when compared with subjects who are neither heavy drinkers nor problem drinkers, have at the same time

a. higher Drug Use scores,
b. higher Drug Problems scores,
c. higher Dysphoria scores,
d. higher Criminal Justice Index scores, and
e. fewer months of employment since intake.

Hypothesis II

Subjects with a history of alcohol abuse prior to the time that they enter treatment for drug abuse will have poorer outcome status than other subjects in regard to alcohol abuse and other aspects of functioning.

Prediction 3: Subjects who report a history of problem drinking in the intake interview will, when compared with subjects without a history of problem drinking, be characterized at the time of followup by

a. higher Alcohol Consumption scores,
b. higher Alcohol Problems scores,
c. higher Drug Use scores,
d. higher Drug Problems scores,
e. higher Dysphoria scores,
f. higher Criminal Justice Index scores, and
g. fewer months of employment since intake.

Prediction 4: Current problem drinkers as determined in the intake interview, when compared with past problem drinkers, will be characterized at the time of followup by

a. higher Alcohol Consumption scores,
b. higher Alcohol Problems scores,
c. higher Drug Use scores,
d. higher Drug Problems scores,
e. higher Dysphoria scores,
f. higher Criminal Justice Index scores, and
g. fewer months of employment since intake.

Prediction 5: Subjects who report a history of heavy drinking but not problem drinking in the intake interview will, when compared with subjects who have no history of either heavy drinking or problem drinking, be characterized at the time of followup by

a. higher Alcohol Consumption scores,
b. higher Alcohol Problems scores,
c. higher Drug Use scores,
d. higher Drug Problems scores,
e. higher Dysphoria scores,
f. higher Criminal Justice Index scores, and
g. fewer months of employment since intake.

Prediction 6: Current heavy drinkers with no past history of problem drinking, when compared with past heavy drinkers with no history of problem drinking, will be characterized at the time of followup by

a. higher Alcohol Consumption scores,
b. higher Alcohol Problems scores,
c. higher Drug Use scores,
d. higher Drug Problems scores,
e. higher Dysphoria scores,
f. higher Criminial Justice Index scores, and
g. fewer months of employment since intake.

In addition to issues tested by the hypotheses, some further study questions were addressed. They are: (1) How prevalent is a history of alcohol abuse among drug addicts entering treatment? (2) What are the pretreatment characteristics of drug addicts with a history of alcohol abuse? and (3) How well can different aspects of treatment outcome be predicted at the time of intake? The remaining two issues are concerned with treatment modality. They are: (4) What changes were observed in both modalities from intake to followup? (5) Does methadone maintenance lead to alcohol abuse?

3. Types of Pretreatment Drinking Histories

Two major dimensions of alcohol use and abuse have been defined--consumption and problems--and the procedures for developing scores of these dimensions with good statistical measurement properties have been described in some detail. The scores will enable us to relate drinking behavior at one time with that at another time, and to relate drinking behavior to other types of behavior by various statistical measures of association. It is important, however, not only to measure dimensions but to attempt to categorize individuals as well.

To answer these questions, a preadmission empirical typology of the drinking histories obtained was developed. The resulting typology has three dimensions: (a) level of alcohol consumption, (b) level of alcohol-related problems, and (c) the time dimension, whether a given pattern of consumption and problems was currently active on admission to treatment or existed only in the past.

Not all combinations of these three dimensions are logically possible, since a high problems scores cannot occur with zero consumption, and the current versus past distinction applies only to those whose lifetime maximum consumption was in the high range. As a result, there are seven possible types.

THE TYPES AND THEIR PREVALENCE

The distribution of alcohol types is presented in table 3.

Figures 2 and 3 show graphically, for the drug addicts only, the average alcohol consumption and Alcohol Problems Scores for both lifetime and the current period for each type.

Types I and II represent those with a history of problem drinking, past or current, and included 24.5 percent of the drug addicts and 95.6 percent of the alcoholics. Types III and IV reported high alcohol consumption (past or current), but few or no problems related to drinking, and included 25.8 percent of drug addicts and 3.1 percent of alcoholics. The presence of a few alcoholics in these two groups (seven cases) suggests that some subjects in these groups did in fact have problems but either denied them to themselves or merely failed to report them in the interview. Types I, II, III, and IV thus include all subjects who reported that they had ever been heavy drinkers--98.7 percent of the alcoholics and 50.3 percent of the drug addicts.

Types V and VII consist of moderate drinkers, and include 27.1 percent of the drug addicts and 1.3 percent of the alcoholics. Most of the moderate drinkers did not report a high level of alcohol problems (Type V), but a few did (Type VII). In all, 7 percent of

TABLE 3.—Preadmission empirical typology of drinking histories

Type	Alcohol Consumption: Max	Alcohol Consumption: Current	Lifetime Alcohol Problems	Percent of Alcoholics	Percent of All Drug Addicts	Percent of EHRC Drug Addicts	Percent of MM Drug Addicts
I	High	High	High	77.6	13.7	11.4	14.8
II	High	Mod, None	High	18.0	10.7	16.4	8.0
				95.6	24.5	27.9	22.9
III	High	High	Low, None	1.8	11.4	7.5	13.3
IV	High	Mod, None	Low, None	1.3	14.3	13.9	14.5
				3.1	25.8	21.4	27.8
V	Mod	Mod, None	Low, None	.4	25.3	25.4	25.3
VI	None	None	None	--	22.6	22.5	22.7
				.4	47.9	47.9	48.0
VII	Mod	Mod, None	High	.9	1.8	2.9	1.4
				N=228	N=866	N=280	N=586

LABELS:

I. Current Problem Drinkers (and Heavy Drinkers)
II. Past Problem Drinkers (and Heavy Drinkers)
III. Current Heavy Drinkers (no history of problems)
IV. Past Heavy Drinkers (no history of problems)
V. Moderate Drinkers (no history of problems)
VI. Abstainers
VII. Moderate Drinkers with Problems

24 24 24 A

FIGURE 2.—Mean daily average alcohol consumption by drug addicts in each drinking history type (expressed in equivalent ounces of whiskey)

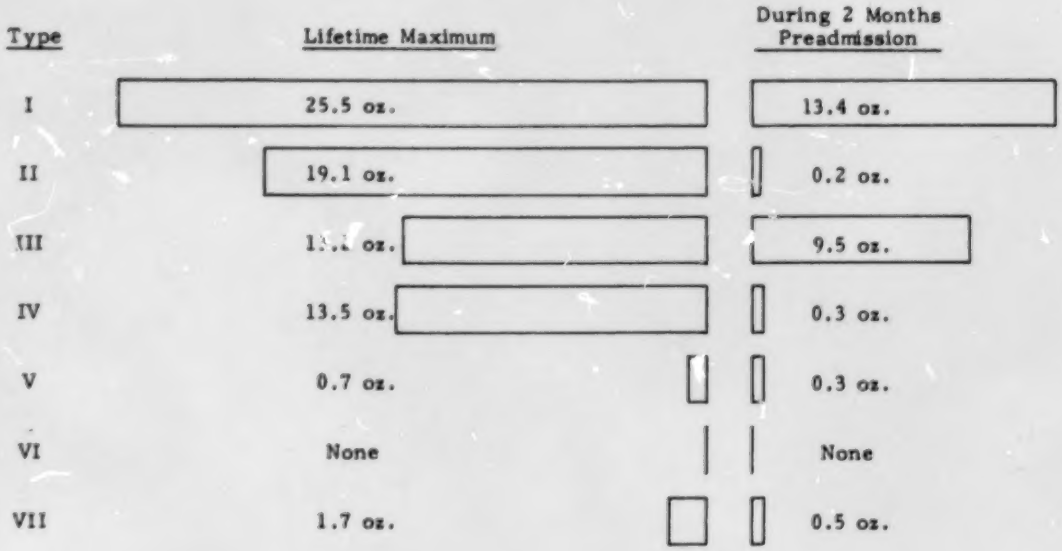
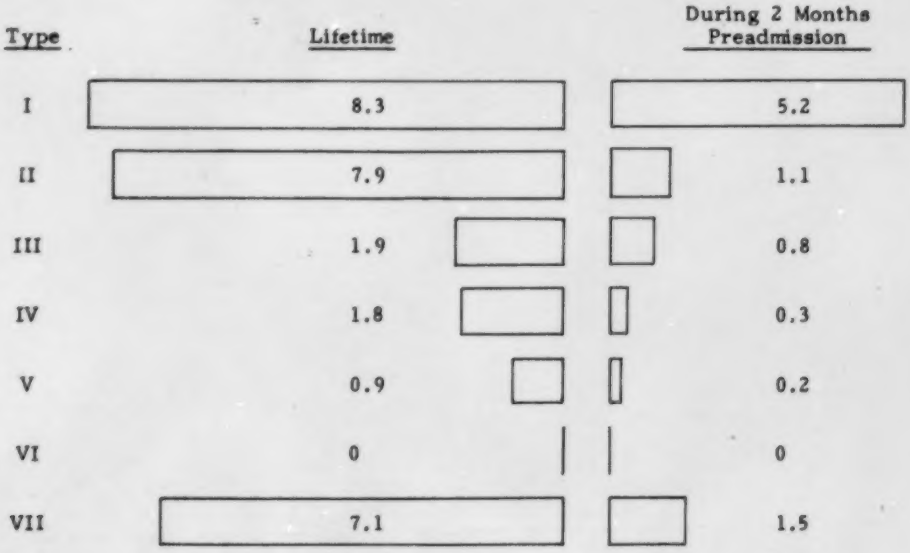


FIGURE 3.—Mean Alcohol Problems Score of drug addicts in each drinking history type



the drug addicts who claimed that their alcohol consumption had never exceeded a moderate level, according to our definition, reported a high level of alcohol problems. Low though this figure is, one wonders why there are any such cases; the fact that the maximum alcohol consumption of Type VII was somewhat higher than that of Type V (see figure 2) does not seem sufficient explanation. Some of the findings suggest a tentative interpretation which will be proposed at the end of this chapter.

Type VI consists of subjects who claimed that they had never consumed alcoholic beverages, and includes 22.6 percent of the drug addicts and no alcoholics.

The distribution of subjects over the types sheds light on the nature of the relationship between problem drinking and heavy drinking. If we examine the lifetime alcohol histories of the drug addicts, it can be seen that close to half (48.7 percent) of those who have been heavy drinkers (Types I, II, III, and IV) have also been problem drinkers (Types I and II). If, however, we consider all who have been problem drinkers (Types I, II, and VII), virtually all (93.0 percent have also been heavy drinkers (Types I and II). It would appear that, with rare exceptions, heavy drinking is a necessary but not sufficient condition for the occurrence of a high level of alcohol-related problems.

The concentration of alcoholics in Types I and II follows, of course, from the fact that the criteria were based on their responses. By definition, then, Types I and II indicate a history of problem drinking. If so, about a quarter of the drug addicts in this sample had, at some time in their lives, resembled the EHRC alcoholics in their drinking behavior and its effects. At the time that their drinking was at its maximum, they drank an average of 22.4 ounces of whiskey daily, or more than 1¼ pints of 90-proof alcohol. Those in Type I averaged a fifth of whiskey at their maximum. Of subjects in these two types, 56.1 percent of the drug addicts and 81.2 percent of the alcoholics were still drinking at alcoholic levels at the time they entered treatment.

Analyses of the study sample indicated that a number of the addicts had reduced or stopped their drinking as they began to abuse other drugs. The same was true of the drug addicts in Types III and IV. Close to half of those who had once consumed large quantities of alcohol, but denied problems, had reduced or stopped their drinking, most often after beginning to abuse other drugs. One might expect that drug addicts who once drank excessively would be at higher risk for developing drinking problems during or after treatment for their drug problem than those without such a history. This issue will be explored by examination of the 12-month followup data.

The types were compared in regard to age, race, and sex, and did not differ significantly on any of these variables. The EHRC and methadone samples did differ significantly however (X^2=22.017; df=6; $p < .01$) in their distributions over the types. As is shown in table 3, the two treatment groups did not differ in the proportions claiming lifetime moderate drinking or abstinence. Of those who had been heavy drinkers at some time in their lives, however, more of the EHRC subjects fell into Type II, while methadone subjects were more likely to fall into Types I and III. In other words, the EHRC residents were more likely to have been past problem drinkers, while the methadone clients were more likely to be current heavy drinkers, with or without problems. As has been noted in chapter 1, slightly more than half (55 percent) of the EHRC subjects entered treatment from prison, hospital, or other residential programs, compared with very few (6 percent) methadone subjects. Correspondingly, 32 percent of the Type II subjects entered treatment from prison, hospital, or residential treatment, versus only 14 percent of those in Types I, III, and IV. These differences suggest that at least some of the abstinence or reduced drinking of the past heavy drinkers was involuntary, even though subjects were asked to respond on the basis of their last two months "on the street." The somewhat greater proportion of problem drinkers (Types I, II, and VII) overall in the EHRC sample is in keeping with the evidence cited in chapter 1 of greater pathology in this treatment population.

CORRELATES OF THE DRINKING HISTORY TYPOLOGY

The next question to be addressed is whether this typology has implications beyond the clients' drinking behaviors. Three broad areas were examined: childhood and social characteristics; drug use and its consequences; and psychological characteristics.

When the seven drinking types were compared on a number of measures relevant to these three areas, it became apparent that consistent differences in pretreatment measures were associated with a broad dichotomization of subjects: problem drinkers, past or present (Types I and II), and those with no history of problem drinking (Types III, IV, V, VI, and VII). Differences within each of these

two groupings were minor and, overall, were item-specific or within chance probabilities. Thus, the most important feature of the drug addict's history of involvement with alcohol, in terms of its implications for other aspects of his life prior to intake, is whether or not he or she has ever manifested symptoms of problem drinking, and not merely the quantities of alcohol consumed. All findings reported in this section represent differences between the two groups, unless otherwise noted.

Childhood and Social Differences between Problem Drinkers and Nonproblem Drinkers

There were no significant differences between the two groups in general measures of social class while growing up, such as parents' education and parents' occupations, or in race, sex, or age.

When asked about their school experiences, the problem drinkers' responses indicated that they had experienced significantly more difficulty concentrating on what the teacher was saying than the nonproblem drinkers ($p < .01$), they more often made mistakes through doing things too fast ($p < .001$), they more often got into fights at school ($p < .01$), and they more often skipped school ($p < .01$). There was no difference between problem drinkers and others in more objective statements about difficulty in school, such as being expelled, having to repeat a grade, or being suspended. The problem-drinking drug addicts in our sample seem to have had significantly ($p < .05$) more internal and behavior problems in school than the nonproblem drinkers, with hyperactivity a major feature, though they do not seem to have experienced any more official negative sanction for their deviant behavior.

Problem-drinking addicts claimed significantly ($p < .05$) more often than others that they had had unhappy childhoods. Both groups claimed closeness to their mothers while growing up, but they differed on the issue of closeness to father. The nondrinkers claimed to have been closer to their fathers than did the problem drinkers ($p < .01$). These data suggest that the problem drinkers come from less cohesive families than the nonproblem drinkers, and were less able to identify with a close father figure.

The problem drinkers reported significantly more deaths in the family during their childhoods, especially death of the mother ($p < .01$). They reported significantly more often that someone in the family was often violent ($p < .001$), that they were abused or beaten as children ($p < .01$), and that someone in their childhood home had a mental breakdown, or exhibited bizarre behavior of some kind ($p < .02$). Thus, within a sample which comes largely from broken, unstable homes, and whose childhood experiences were poor by general standards, those who have had problems with alcohol, in addition to other drugs, have had even more chaotic childhoods than the drug addicts without this complicating problem.

The subjects were then asked about attitudes toward alcohol in their childhood homes. Problem drinkers were significantly ($p < .05$) more likely than other addicts to have come from homes where parents either clearly approved or clearly disapproved of alcohol; in other words, from homes where alcohol was an issue. The nonproblem drinkers tended to report that they either did not know their parents' attitudes, or that their parents neither approved nor disapproved of alcohol. Furthermore, problem drinkers were more likely than other addicts to report mothers, fathers, sisters, and brothers who used alcohol excessively during their childhood. Thus, it seems clear that more of the problem drinking addicts had alcohol-abusing role models.

Assessment of the subjects' adult lifestyles indicated that the problem-drinking addicts had significantly less stable lives. They had, on the average, moved more often in the last 2 years, and were significantly more likely to report having been "on the bum," with no regular place to live ($p < .001$). When queried about their sources of support, the problem-drinking addicts significantly ($p < .05$) more often than nonproblem drinkers reported income from selling drugs and other illegal activities.

Their arrest records reflect this differential involvement in criminal activities. Problem drinkers were more likely to have been arrested at all ($p < .02$), they had spent more time in jail ($p < .001$), had been charged with more crimes against individuals and crimes against property, as well as more charges of drunkenness and disorderly conduct ($p < .001$), driving under the influence ($p < .01$), and other motor vehicle violations ($p < .02$).

As for their current social interactions, predictably, the addicts who reported current problems associated with drinking reported significantly ($p < .05$) more often than the other groups that they currently had friends who drank excessively. All in all, the adult lifestyles of the problem-drinking drug addicts were even more deviant and unstable than those of the non-problem-drinking drug addicts.

The data indicate that addicts who have a drinking problem in addition to their primary addiction to a drug have had more chaotic childhoods than addicts who do not report a drinking problem, as well as more deviant and unstable lifestyles as adults.

The data support the notion that a major problem with alcohol, over and above another substance abuse problem, is not a result or symptom of heavier involvement with a drug-abusing subculture. Instead, the problem drinking appears to be associated with early childhood factors which predate involvement with such a subculture.

Differences in Drug Histories

For the proposed typology of drug addicts to be of maximum interpretive and predictive value, its types should be differentiated by variables that are related to drugs other than alcohol. Measures of current drug use and the Drug Problems score were both related to the typology beyond the .001 level, but with a notable difference which is probably a function of the time span covered by each measure.

When we examine the measures of drug use in the 2 months before intake, we find that they correspond to the pattern of current alcohol use (with the striking exception of the small number in Type VII, which must be discussed separately). Types I and III, those with a currently high level of alcohol consumption, were also using a larger number of drug classes than other subjects. Table 4 shows that, of the seven types that include all but a few of the subjects, Types I and III reported using drugs in more of the six drug categories, while those in Type VI, who had never been drinkers, used the least number of other drugs as well. The former heavy drinkers (Types II and IV) and the moderate drinkers (Type V) used an intermediate number of drugs. If the heavy alcohol use of Types I and III is added to the list of other drug categories used regularly by them (last column of table 4), it is seen that these subjects regularly used about twice as many kinds of psychoactive substances during the 2 months before entering treatment as did subjects in Types II, IV, V, and VI.

As regards the specific drug categories, the current heavy drinkers reported significantly greater current use of narcotics, amphetamines, marihuana, and tranquilizers than the other subjects. Their use of the other two categories, sedatives and cocaine, was somewhat, but not significantly, greater than that of the other subjects.

The groups with the highest Drug Problems scores were, however, Types I, II, and VII (with Type VII the highest); these are, of course, the three types with high Lifetime Alcohol Problems scores. It should be kept in mind that the Drug Problems Score obtained at intake resembled the Lifetime Alcohol Problems Score in that it too was based on the lifetime history. Types I, II, and VII differed significantly from the other drug addicts in regard to all three components of the Drug Problems Score--loss of control, bad reactions, and life consequences. The problem-drinking addicts also scored higher ($p < .001$) in Motivation for Drug Use, giving more weight than other subjects to such reasons for using drugs as "need it when tense and nervous," "to forget everything," and "helps my mind work better." Furthermore, the problem drinkers reported significantly more complications of drug use, such as overdose, crash, and bad trips.

The strong relationship between the Alcohol Problem and Drug Problem Scores might suggest that subjects had difficulty in differentiating between alcohol and drugs as sources of their problems. However, the questions and the order in which they were asked were designed so as to minimize such confusion. A tenable alternative hypothesis is that the kind of person who experiences loss of control, adverse psychological and physiological reactions, and negative life consequences from the use of one substance is highly likely to experience the same kind of effects from the use of another substance. It should be kept in mind that subjects in all of the types reported a high level of drug-related problems. Nevertheless, those with a history of problem drinking exceeded even that high level of drug-related problems.

Psychological Differences

The types were compared with regard to the eight personality scales (see earlier section on Psychological Status). The problem-drinking addicts scored significantly higher than the other addicts on "depression," "phobic-anxiety," "dependency on others" (all $p < .001$), "resistance to authority," and "sociability" (both $p < .01$), and significantly lower ($p < .01$) on "happiness." They therefore were significantly higher ($p < .001$) on the Dysphoria Scale; the most dysphoric group was the small number of subjects in Type VII, the problem drinkers who were not heavy drinkers. They did not differ in "mistrust" or "ability to cope." These findings are compatible with the literature on alcoholism which is replete with descriptions of the problem drinker as dependent, anxious,

TABLE 4.—Number of drugs used and number used regularly in the 2 months before intake by drug addicts with different drinking histories

Type	N	Excluding Alcohol: Mean Number of Drug Classes Used		Excluding Alcohol: Mean Number of Drug Classes Used Regularly		Including Heavy Alcohol Use: Mean Number of Drug Classes Used Regularly	
I	107	2.83	2.86	2.22	2.24	3.22	3.24
III	88	2.90		2.26		3.26	
II	86	2.23		1.60		1.60	
IV	109	2.40	2.32	1.72	1.66	1.72	1.66
V	192	2.32		1.65		1.65	
VI	168	1.89		1.48		1.48	
VII	14	3.21		2.36		2.36	
All Cases	764	2.38		1.78		2.04	
(Standard Deviation)		(1.42)		(1.18)		(1.34)	
r with current alcohol consumption		.303*		.300*			

*$p < .001$

NOTE: The Ns in this table include only subjects for whom followup data is available since this table was generated for comparison with drug use on follow-up.

depressed, and resistant to authority (Hanfman 1951; Jones 1968; Singer et al. 1964). There is conflicting evidence as to the sociability of problem drinkers.

Suicidal thoughts and attempts represent the extreme manifestations of depression and anxiety. The proportions reporting that they had thought about taking their lives (37 percent versus 26 percent), or had actually attempted suicide (21 percent versus 11 percent) were greater among problem-drinking addicts (p .001). Problem drinkers also showed significantly less "worry" about 14 items, including money, jobs, sex, drugs, and life in general (p .001) than did non-problem drinkers.

Type VII--A Special Type of Problem-Drinking Addict

There were 16 subjects in Type VII who reported having had many problems stemming from alcohol in the past, although they claimed never to have consumed large quantities of alcohol. Their mean Lifetime Drug Problems Score was the highest of any type, and in the 2 months before admission they reported using more types of drugs than any other group, but not large amounts of alcohol. Several additional facts may help in understanding them. They were the most dysphoric of the types; their suicidal history was particularly noteworthy. They also had by far the highest Motivation for Drug Use scores of any group, and they used more classes of drugs than any other type (see table 4). Furthermore, while their current use of all drugs except marihuana was above average, and they were daily users of narcotics, it was their use of tranquilizers and sedatives that was most distinctive.

Type VII thus appears to be a particularly disturbed group of drug addicts, severely depressed and using a variety of drugs, possibly as a form of self-medication. The fact that they use sedative drugs particularly may, in fact, add to their depression. As for their unusual alcohol histories, one hypothesis is that they react badly to small doses of alcohol, or that they have used alcohol in combination with other sedative drugs, with adverse effects. Since their alcohol problems are reported as being in the past, it is possible that an early period of experimentation with alcohol was abandoned in favor of other anxiety-reducing drugs that these subjects found more agreeable to them. Both their drug histories and their psychological characteristics are reminiscent of those labelled "polydrug users" by other researchers.

Summary

We have, then, demonstrated that an empirically derived typology of the drinking histories reported by drug addicts is descriptively useful, and that the correlated phenomena show problem-drinking drug addicts to be different from other drug addicts. The most striking finding is the high incidence of problem drinking in the histories of individuals whose presenting problem on entering treatment was identified as drug abuse. A quarter reported histories that could be taken as sufficient clinical evidence of alcoholism, past or present. An additional quarter had ingested excessive quantities of alcohol, although associated problems were denied. For half of the addict sample, it seems likely that the problem is substance abuse as such, not the abuse of a particular substance.

Current heavy drinkers, regardless of alcohol problems, used greater numbers of drug classes than did other subjects.

The problem-drinking drug addicts had more pathological early histories and more deviant adult behavior and personality than other subjects. This suggests that the problem-drinking addict is a different type of addict to begin with, one whose addiction is more diffuse and general in nature, possibly deeply rooted within his total personality structure. If this speculation is correct, then the prognosis for the problem-drinking addict is likely to be poor, unless he receives treatment designed to meet his special needs.

4. Change Over the Year of Observation

It was important to determine whether there had been any consistent change during the year of observation for each of the study's outcome criteria.

The procedure involved a separate analysis for the EHRC sample and the methadone maintenance sample, as well as including treatment retention in work programs to examine different outcome statuses.

Table 5 shows the change from intake to followup status for each of the outcome variables, and tests the significance of change by *t* tests for correlated means.

It is apparent that clients in both treatment modalities showed highly significant reductions in drug use, drug-related problems, and dysphoria. In both modalities, there were very great and highly significant ($p < .001$) reductions in the use of all drug categories except marihuana. Although EHRC subjects reduced marihuana use significantly ($p < .01$), methadone subjects showed no change in marihuana use on the average. It is worth noting that there were significant pretreatment differences between the two samples in their drug use patterns, with EHRC subjects reporting more use of sedatives and amphetamines, while methadone subjects reported more use of narcotics and cocaine. A year later, the only significant differences in drug categories were the lower use of marihuana and cocaine by EHRC subjects. As a result, the differences between methadone and EHRC subjects in the Drug Use Index was reduced, but remained statistically significant. Average months of employment per year did not change among EHRC subjects, while for methadone subjects there was a statistically significant but seemingly small reduction in months worked.

Most notable, perhaps, is the lack of change in alcohol-related problems, and the fact that alcohol consumption dropped from the level current on admission only for methadone subjects. Prior to intake, consumption was higher for methadone than for EHRC subjects ($p < .001$). On followup, the level of consumption of methadone subjects had dropped although it remained still higher than that of EHRC subjects.

Table 6 shows the relationships between each of the followup measures and retention in treatment. Since the two modalities differ both in the nature of their programs and the populations that they serve, data are presented separately for the EHRC and methadone samples.

For EHRC, retention in treatment was measured by successful completion of the 2-month inpatient phase of the program leading to a

"treatment completed" discharge; 53.3 percent of the EHRC residents achieved that status. For the methadone programs, those who remained in treatment continuously for the entire year of observation (31.4 percent of the methadone clients) were compared with those who were discharged at least once, whether they were readmitted to treatment or not.

Retention in treatment is associated with superior status on a majority of the seven outcome measures in each modality, although the measures are not the same for each. Clients who remained in treatment in either modality showed significantly less involvement with the criminal justice system and more months of employment. At EHRC, it should be recalled, those in the Candidate phase were considered to be employed.

EHRC clients who remained in treatment showed reduced but not statistically significant use of drugs. Methadone clients who had remained in the same program for the entire year were using drugs significantly less on followup than were those who had left treatment. The drug categories responsible for the decrease in the methadone clients were narcotics, sedative-barbiturate drugs (both at the .001 level), and tranquilizers (.01 level).

Dysphoria was significantly greater among EHRC ex-residents who failed to complete the inpatient program than for those who did so. It should be noted (see table 5) that the average level of dysphoria on intake was greater in the EHRC sample than among the methadone clients. The differences in the outcome dysphoria mean scores shown in table 6 arise because those completing the EHRC program had a greater decrease in dysphoria over the year of followup than did the EHRC dropouts or either of the methadone treatment groups.

Both alcohol consumption and alcohol-related problems were significantly less among those completing the EHRC program than among those who failed to complete treatment. Can this be considered a treatment effect, since table 5 showed no overall reduction in these measures for the entire EHRC sample? That this may be a possibility is suggested by the fact that EHRC ex-residents who completed treatment showed a decrease in both measures, while those who did not complete treatment increased both their consumption of alcohol and related problems. If there was indeed reduction in alcohol use and abuse attributable to completing the EHRC program, it may be the product of the strong abstinence ethic pervading Eagleville, as well as the influence of being treated together with alcoholics in combined treatment.

In the methadone maintenance sample, those in continuous treatment showed slightly higher Alcohol Consumption and Alcohol Problem Scores than those with one or more discharges. One of the methadone programs in the study, however, was notable for the reduction in alcohol consumption among its clients, whose consumption prior to admission was well above the average. It is of interest that this program is part of a larger facility that is well known for its alcoholism program. It seems likely that its staff is alerted to alcohol problems and is more skilled at dealing with them than the staffs of other methadone programs not affiliated with an alcoholism program.

CHANGES IN DRINKING PATTERNS

We have just seen that, overall, there were no significant differences between the mean Current Alcohol Problems Score on intake and that on followup. There was also, for the entire sample, no significant difference between Current Alcohol Consumption on intake and that at followup, although for methadone subjects alone there was a statistically significant drop. In addition to examining group means, however, it is useful to identify types of drinking patterns reported on followup, in order to compare persons with one type of pattern with those manifesting other types in regard to their outcomes on variables other than drinking measures.

The followup types are comparable to the empirical typology developed from the intake data, except that the current versus past distinction is not relevant. The followup typology developed is indicated below:

Type A: Subjects who were both problem drinkers and heavy drinkers at the time of followup--comparable to Type I on intake.

Type B: Subjects who reported many problems, but only moderate intake; they would be comparable to Type VII, except that for most of those in Type VII, problem drinking was no longer current on intake.

Type C: Subjects who are heavy drinkers but who reported few or no alcohol problems--comparable to Type III.

Type D: Subjects who are moderate drinkers with few or no problems--comparable to Type V, with the addition of those subjects in Types II and IV who were drinking at moderate levels on intake (about 40 percent of them) plus those in Type VII who were no longer problem drinkers on intake.

Type E: Subjects who reported no drinking at all, comparable to Type VI, with the addi-

TABLE 5.—Change in mean criterion measures[1] over 1 year of observation by treatment modality

	EHRC N=190/242			METHADONE N=468/522		
	Intake[2]	Followup	t	Intake[2]	Followup	t
Alcohol Consumption Score:	2.16	2.41	1.03	3.40	2.96	3.15*
(Equiv. ounces)	(.26)	(.33)		(.79)	(.55)	
Alcohol Problems	1.22	1.18	0.16	.98	1.11	1.29
Drug Use[3]	3.30	2.23	5.30**	4.12	2.71	13.04**
Drug Problems	10.40	3.88	19.64**	9.48	3.75	32.71**
Dysphoria	31.27	22.76	11.25**	28.59	21.97	14.09**
Months employed per year	4.31	4.17	0.42	4.06	3.43	2.97*

*$p < .001$

**$p < .01$

[1]Change cannot be assessed for the Criminal Justice measure, because the intake measure covers the lifetime history, while the followup measure covers only 1 year.

[2]The intake scores for Alcohol Consumption, Alcohol Problems, and Drug Use refer to the 2 months prior to intake. Months employed is based on the two years before intake, divided by 2 so as to be comparable with the 1 year of followup.

[3]In all subsequent analyses of data, prescribed drugs were excluded from the Drug Use Index. Information about prescribed use was unfortunately not available in the intake interview, however. Drug Use on followup has therefore been recomputed without discounting prescribed use for this table, so that intake and followup may be compared.

NOTE: The first N given for each group applies to the four drug and alcohol measures, where only those at risk (i.e., not in prison) were included. The second N includes all subjects followed at one year.

The t test for correlated means was used.

TABLE 6.—Mean outcome criterion measures as a function of treatment retention by treatment modality

	EHRC			METHADONE		
	Completed Program	Did Not Complete	t	Continuous Treatment	One or More Discharges	t
N=	102/129	88/113		164	304/358	
Alcohol Consumption Score:	1.99	2.89	2.47*	3.09	2.89	0.76
(Equiv. ounces)	(.22)	(.52)		(.62)	(.52)	
Alcohol Problems	.81	1.61	2.14*	1.29	1.02	1.15
Drug Use[1] (prescribed drugs excluded)	1.69	2.10	1.54	1.93	2.65	4.25**
Drug Use (prescribed drugs not excluded)	2.12	2.36	0.86	2.20	2.99	4.51**
Drug Problems	2.83	5.10	3.70**	2.74	4.30	4.27**
Dysphoria	21.42	24.30	2.42*	21.03	22.39	1.47
Criminal Justice Index	1.56	2.58	3.83**	.53	1.69	8.46**
Months employed per year	4.99	3.23	3.41**	4.62	2.88	5.44**

*$p < .05$

**$p < .001$

[1]In all subsequent analyses of data, the Drug Use Index was computed with prescribed drugs excluded. It is also presented here without excluding prescribed drugs to facilitate comparison with table 5.

tion of the subjects in Types II, IV, and VII who were not drinking at all in the 2 months before intake.

Since the criteria for "heavy drinking" and for "problem drinking" in the intake interview were based on the distributions of lifetime maximum (alcohol consumption) and Alcohol Problems Scores, it was felt appropriate to lower the criteria somewhat for the followup data, in which the focus was on current use only. The lifetime maximum consumption tends to be very much higher than it is for any 2-month period, even a period when the person is drinking at a level that causes problems. For followup data, the criterion for high alcohol consumption was therefore dropped one scale point (an equivalent of 1.85 ounces of whiskey daily); for alcohol problems, a followup score of three or more was considered to indicate a current problem drinker.[3]

If we consider only those at risk for drinking, the two treatment samples did not differ in the proportion of problem drinkers on followup (i.e., those in Types A and B, which included 16.8 percent of methadone subjects at risk versus 15.8 percent of EHRC subjects at risk). The methadone sample did have a somewhat larger proportion of heavy drinkers (33.1 percent versus 23.2 percent of EHRC subjects in Types A and C, a difference significant at the .02 level).

Figure 4 shows the relationships between the intake and followup typologies. It is oriented so as to demonstrate the predictive value of the intake data on alcohol consumption and alcohol problems for identical followup data; for each intake type, the distribution of subjects over the followup types is shown. Of the six main groups, those in Types I and III, i.e., current alcohol problems or heavy drinkers on intake, had by far the highest proportions with alcohol problems on followup (i.e., Types A and B) as well as an above-average proportion of heavy drinkers who did not report many problems (Type C). The small group of Type VII subjects were also more likely than other types to be problem drinkers or heavy drinkers on followup. Types V and VI had few subjects who became problem drinkers or heavy drinkers by followup; predictably, more of Type V were moderate drinkers and more of Type VI were still abstainers. Types II and IV, i.e., former heavy drinkers with or without a history of problems, were intermediate in their outcomes as regards drinking.

Figure 4 makes it clear that time dimension is very important in using the intake alcohol history to predict the subject's involvement with alcohol on followup. The worst prognosis is for those who are currently drinking heavily (with or without problems) at the time of intake, followed by past heavy drinkers, and the best prognosis for those who had no history of either problem drinking or heavy drinking. Within each time category, a history of alcohol problems further worsens the prognosis, particularly as regards problem drinking on followup, but to a limited degree. Thus, the poorest outcomes in regard to drinking may be expected from those who are active problem drinkers at the time of admission to treatment, followed by active heavy drinkers. These pre-post relationships are essentially the same for the methadone and EHRC samples.

5. How are Problem Drinking and Heavy Drinking Related to Treatment Outcome?

We are now able to test the hypotheses of this study--the relationships between problem drinking, both before and after admission to treatment, and the outcome of treatment as assessed by its primary goal of reducing drug use and associated problems as well as the related goals of alleviating dysphoria and criminal behavior and increasing employment. We have already seen that a significant degree of improvement occurred in most of these aspects of behavior over the course of the followup year and, furthermore, that retention in treatment was associated with better followup status for both the methadone and the Eagleville samples. To what extent can differences among subjects in their followup status be correlated to their involvement with alcohol at various stages of treatment? This chapter examines measures of association among variables at different time frames.

Table 7 presents, for the entire followup sample, the correlations of the four alcohol measures obtained on intake and the two alcohol measures obtained on followup with each other, and with the five other outcome measures. It shows, first of all, as has already been shown in other ways, that the alcohol measures are highly intercorrelated, both within each interview and between the intake and followup interviews.

It is the lower portion of table 7, however, which tests and, in most respects, confirms the hypotheses of the study. It shows that four of the five outcome measures were each significantly correlated with two or more of the four intake alcohol measures. Furthermore, each of these four outcome measures was significantly correlated with both of the outcome alcohol measures, and they were more

FIGURE 4.—Drinking pattern at 12-month followup as a function of pretreatment drinking pattern (in percent)

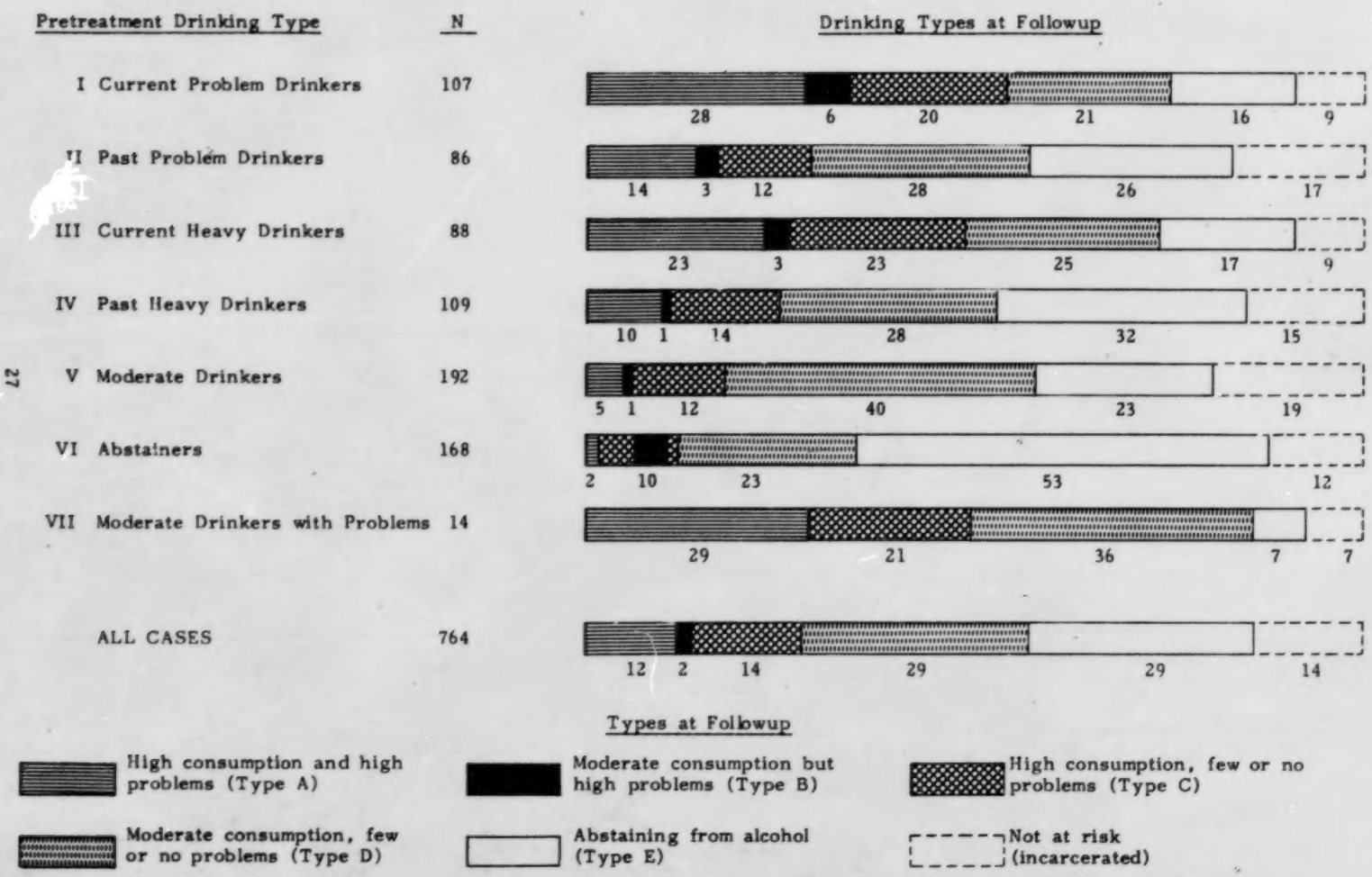

Pretreatment Drinking Type
N
Drinking Types at Followup
I Current Problem Drinkers 107
28 6 20 21 16 9
II Past Problem Drinkers 86
14 3 12 28 26 17
III Current Heavy Drinkers 88
23 3 23 25 17 9
IV Past Heavy Drinkers 109
10 1 14 28 32 15
V Moderate Drinkers 192
5 1 12 40 23 19
VI Abstainers 168
2 10 23 53 12
VII Moderate Drinkers with Problems 14
29 21 36 7 7
ALL CASES 764
12 2 14 29 29 14
Types at Followup
High consumption and high problems (Type A)
Moderate consumption but high problems (Type B)
High consumption, few or no problems (Type C)
Moderate consumption, few or no problems (Type D)
Abstaining from alcohol (Type E)
Not at risk (incarcerated)

TABLE 7.—Correlations of intake and outcome drinking measures with other measures of outcome and with each other

	INTAKE DRINKING MEASURES				OUTCOME DRINKING MEASURES	
	Alcohol Consumption, Current	Alcohol Consumption, Lifetime	Alcohol Problems, Current	Alcohol Problems, Lifetime	Alcohol Consumption	Alcohol Problems
Intake						
Alcohol Consumption, Current						
Alcohol Consumption, Lifetime	66***					
Alcohol Problems, Current	54***	40***				
Alcohol Problems, Lifetime	44***	65***	67***			
Outcome						
Alcohol Consumption	40***	34***	26***	28***		
Alcohol Problems	36***	31***	43***	39***	58***	
Drug Use	12***	11**	04	04	26***	21***
Drug Problems	04	09*	10**	10**	16***	31***
Dysphoria	09**	10**	19***	12***	08*	29***
Criminal Justice Index	-01	09**	06	14***	12**	20***
Months employed	-05	-05	-03	00	-02	-09**

*p < .05

**p < .01

***p < .001

NOTE: Decimal points are omitted. N=658 for all r's involving 12-month alcohol and drug measures, 764 for all other r's.

strongly related to drinking behavior on followup than to the drinking behavior and history reported at intake. The one outcome measure for which the hypotheses were not confirmed was employment which, as we have seen in table 5, was also the only measure that did not show significant improvement over the year of observation. It must be noted that in instances of significant correlations, the correlations are sometimes indicative of weak associations, and the reader must be guarded about inferences. Significant correlations of .09 and .14, for example, would explain .01 and .02 percent of variance, respectively.

The other four outcome measures differed somewhat in their patterns of relationship to the intake drinking variables. The drug use index was predictable from the history of alcohol consumption; heavy drinkers, with or without a history of alcohol-related problems, reported more drug use on followup than other subjects. Heavy drinking prior to intake was most predictive of marihuana use on followup, followed by other nonnarcotic drugs; it did not predict the level of narcotic use on followup. The drug use index was also more strongly related to alcohol consumption on followup than it was to alcohol problems. Alcohol consumption at the time of followup was most strongly correlated with marihuana use (N=.339), but it was significantly related to the use of all other drug categories as well, including narcotics. Alcohol-related problems on followup, however, were more strongly associated with the unprescribed use of tranquilizers than with the use of other types of drugs, and were related to marihuana and barbiturate use as well. This suggests the possibility that problem drinkers may have been using drugs as a means of self-medication.'

The outcome measures of drug-related problems and dysphoria, in contrast to drug use, were more strongly related to alcohol problems than to drinking, per se, on both intake and followup. A question can be raised about the relationship of dysphoria to alcohol problems on intake and followup, since dysphoric reactions to alcohol are a component of the Alcohol Problems Score. Analysis of the components of the Alcohol Problems Score reveals, however, that the comprehensive measure of dysphoria was more strongly related to several other components of the problems score than it was to the dysphoric reactions subscale.

Criminal justice involvement during the followup year was also associated with alcohol problems, and not with heavy drinking in the absence of such problems. It differs from the other outcome measures, however, in that it was related only to the lifetime history of problem drinking, and not the problems current in the 2 months prior to intake. This stems from the fact that subjects who entered treatment directly from prison reported few "current" problems, even though they were asked to report on their last 2 months on the street.

Thus, the data confirm the predictions that problem drinking on followup is associated with poorer outcomes in regard to drug use (especially the use of tranquilizers and other nonnarcotic sedatives), drug-related problems, dysphoria, and criminal justice involvement. Also confirmed are the predictions that a history of problems associated with drinking before treatment is associated with poorer posttreatment outcomes in regard to drug-related problems, with dysphoria and with criminal justice involvement. While pretreatment problem drinking was not found to be significantly related to posttreatment drug use, pretreatment heavy drinking was related to posttreatment drug use. The hypotheses were not confirmed in regard to posttreatment employment.

Since outcome status has been seen to be related to retention in treatment (table 6), one may wonder whether these findings are merely the result of differences in treatment retention. Were problem drinkers, past or current at intake, more likely to leave treatment prematurely and thus have poorer outcomes? Comparison of subjects retained in treatment with those leaving prematurely, performed separately for the methadone and EHRC subsamples, showed no differences whatsoever on any of the four intake alcohol measures. Thus, both the pretreatment drinking history and the experience in treatment (i.e., retention versus dropping out), independently of each other, significantly improve our ability to predict the treatment outcome of a particular drug addict.

IS HEAVY DRINKING IN ITSELF A POOR PROGNOSTIC SIGN?

We have seen that when alcohol-related problems and high levels of alcohol consumption are considered separately, each of these measures of the person's involvement with alcohol is associated with one or more indications of poor treatment outcome. This is so whether the focus is on the lifetime pretreatment drinking history, the 2 months just before intake, or 12 months after entrance to treatment. Alcohol consumption and problems are, however, closely linked. Is it possible to sort out the relative contributions of problem drink-

TABLE 8.—Comparative outcome scores of problem drinkers, heavy drinkers, and others, based on lifetime pretreatment history, 2 months prior to admission to treatment, and followup (in raw scores and standard scores)

	Problem Drinkers Who Are Also Heavy Drinkers		Heavy Drinkers (Not Problem Drinkers)		Neither	
BASED ON LIFETIME PRETREATMENT HISTORY:						
Types (No. of cases*)	I,II (168/193)		III,IV (173/197)		V,VI (304/360)	
Mean Outcome Scores:	Raw Score	z	Raw Score	z	Raw Score	z
Alcohol Consumption**	1.08	.367	.70	.169	.20	-.323
Alcohol Problems	2.38	.535	1.16	.013	.39	-.317
Drug Use	2.38	.068	2.47	.117	2.04	-.113
Drug Problems	4.45	.163	4.02	.058	3.25	-.133
Dysphoria	23.62	.140	22.75	.053	21.17	-.105
Criminal Justice	1.99	.223	1.37	-.091	1.41	-.070
Months Employed	3.52	.032	3.34	.073	3.80	-.032
BASED ON 2 MONTHS PRIOR TO ADMISSION:						
Types (No. of cases*)	I (97/107)		III (80/88)		II,IV,V,VI (468/555)	
Mean Outcome Scores:	Raw Score	z	Raw Score	z	Raw Score	z
Alcohol Consumption**	1.83	.628	1.26	.443	.27	-.222
Alcohol Problems	3.12	.853	1.55	.179	.63	-.217
Drug Use	2.57	.166	2.61	.190	2.11	-.072
Drug Problems	4.90	.273	3.56	-.056	3.57	-.054
Dysphoria	24.60	.238	22.83	.061	21.66	-.056
Criminal Justice	1.82	.138	1.36	-.094	1.53	-.012
Months Employed	3.15	.116	3.44	.049	3.72	-.014

TABLE 8.—Comparative outcome scores of problem drinkers, heavy drinkers, and others, based on lifetime pretreatment history, 2 months prior to admission to treatment, and followup (in raw scores and standard scores)—Continued

	Problem Drinkers Who Are Also Heavy Drinkers		Heavy Drinkers (Not Problem Drinkers)		Neither	
BASED ON FOLLOWUP:						
Types (No. of cases*)	A (90)		C (190)		D,E (443)	
Mean Outcome Scores:	Raw Score	z	Raw Score	z	Raw Score	z
Drug Use	3.39	.595	2.50	.129	1.97	-.150
Drug Problems	6.51	.667	3.61	-.047	3.26	-.132
Dysphoria	27.49	.550	20.56	-.142	21.19	-.080
Criminal Justice	1.63	.336	1.06	-.013	.93	-.097
Months Employed	2.82	.209	4.32	-.126	3.82	-.014

*Where two Ns are given, the first N applies to the four drug and alcohol outcome measures, where only subjects at risk for substance abuse (i.e., not in prison) were included.

**Alcohol consumption is expressed in the equivalent ounces of whiskey. The z-scores are based on the index score used in the analyses of data.

NOTE: Subjects who reported high alcohol problems but not high alcohol consumption were excluded from these analyses. Those excluded from the analyses based on intake data were Type VII (N=13/14). Excluded from the analyses based solely on followup data were Type B (N=16). The means and sigmas used to obtain the standard scores were based on all cases followed up, however.

All z-scores are oriented so that a positive score represents poorer treatment outcome, while a negative score represents superior rehabilitation.

ing and heavy drinking to the prediction of poor treatment outcome?

In trying to do this, it is necessary to deal with the fact that the relationship between alcohol problems and consumption is not symmetrical. For each time frame, about half of those reporting heavy drinking also reported a high level of problems, while half did not. Problem drinking, however, was rarely reported in the absence of heavy drinking; for the lifetime pretreatment history, only 7 percent of problem drinkers did not report heavy drinking. Thus, the comparison that is both useful and feasible to make is between heavy drinkers who are also problem drinkers and heavy drinkers who deny a significant number of problems stemming from their drinking.

Table 8 compares the outcome status of three groups of subjects: "problem drinkers" who are also heavy drinkers, "heavy drinkers" who are not problem drinkers, and those who did not report either heavy drinking or problem drinking (i.e., moderate drinkers and abstainers).[3] These three groups are defined for three different time frames: the lifetime pretreatment history, the 2 months before admission, and the 2 months before the 12-month followup interview. Omitted from this table are the small groups of subjects who reported problem drinking in the absence of heavy drinking, since their numbers are too small to provide reliable means; in general, their outcomes resembled those of other problem drinkers for the time frame in question.

Although our focus is on the nondrinking aspects of outcome, the two outcome alcohol measures are included for the sake of completeness. They are, however, omitted from the comparison of the followup drinking groups, since these measures form the basis for the definition of the followup groups. Such a comparison would therefore be tautological. Means are presented in two forms: mean raw scores, and z-scores, standardized so that all variables have a mean of zero and a standard deviation of one. The standard scores facilitate comparisons of different outcome measures.

Table 8 shows that problem drinkers, as expected, had poorer outcomes than moderate drinkers and abstainers.

The middle column shows the effect on outcome of heavy drinking, in itself. It shows that a history of heavy drinking reported at intake to treatment, without the report of a significant number of alcohol-related problems, was associated overall with poorer outcomes than the moderate drinkers and abstainers achieved, but somewhat better outcomes than those of the problem drinkers. The prognosis associated with heavy drinking along varied somewhat, depending on the specific outcome variable examined.

Heavy drinking, without associated problems, prior to treatment was associated with greater substance use on followup. As regards both alcohol consumption and drug use on followup, pretreatment heavy drinkers had significantly poorer outcomes than did nonheavy drinkers, and did not differ significantly from the problem drinkers. This was true whether the identification of heavy drinking was based on the lifetime history or on drinking current at the time of intake. Thus level of alcohol consumption prior to treatment was associated with consumption of alcohol and drugs (especially marihuana, but other nonnarcotics as well) on followup, regardless of whether or not problems stemming from that consumption had been reported on intake.

The only outcome measure that was related to problem drinking but not to heavy drinking by itself, was criminal justice involvement. While a history of problem drinking was associated with greater involvement with the criminal justice system during the followup year, heavy drinking alone was associated with no greater involvement than was moderate or no drinking. Heavy drinking was, in fact, associated with the least criminal justice involvement, although not significantly less than that seen in the moderate drinkers and abstainers.

Thus, the data demonstrate that, while an intake history of problem drinking is prognostic of the poorest outcomes, even in the absence of reported alcohol problems, heavy drinking is also a danger sign. Heavy drinking in itself predicts heavy drinking and drug use a year after intake, and the moderately high levels of alcohol problems, drug problems, and dysphoria found at 1 year postintake among heavy drinkers (or, to be more precise, the high levels found in a significant proportion of heavy drinkers) may continue to increase as time goes on, in view of the continued drug and alcohol use.

For the clinician who must evaluate a drug addict coming for treatment in order to plan that treatment, a current high level of alcohol consumption is a serious warning sign, the more so if alcohol-related problems are present. The drug addict not currently experiencing trouble with alcohol or drinking to excess who has done so in the past should also be watched carefully for a possible return to problem drinking after treatment has begun. And, finally, regardless of the pretreatment drinking history, the occurrence of problem drinking at any time creates a high risk of treatment failure, as does heavy drinking that may become problem drinking.

6. Predicting Outcome on Admission to Treatment: A Multivariable Approach

The findings reported in chapter 5 demonstrate that heavy drinking and problem drinking, both before and after admission to treatment for drug abuse would be found to be associated with poorer treatment outcomes. Whereas the previous chapter measured associations among variables, this chapter discusses what portions of treatment outcome variances may be explained by a series of independent variables.

The method used was stepwise multiple regression analysis. In this technique a multiple set of independent variables are correlated with each other and with a single dependent variable in order to ascertain how and to what extent the independent variables can best predict the dependent variable in question. The independent variables were 23 measures derived from the intake interview, and each of the 7 outcome measures served, in turn, as the dependent variable.

These analyses tell how much of the variance of each outcome measure can be accounted for by the particular set of intake measures used. In this way, they provide a minimal

estimate of how well outcome status can be predicted on the basis of information obtained when the person enters treatment. They also tell us which intake measures add significantly to our ability to predict each of the outcome measures.

Of the 23 intake measures used, 11 were pretreatment status measures corresponding to the 7 criterion outcome measures. The other 12 measures represented demographic characteristics, personal history, and, in one instance, current psychological status. A number of other intake measures were considered but not used, either because they were unrelated to any of the outcome measures or because what relationships they did have with outcome measures were already accounted for by variables included in the analysis.[1] The intake measures used in the analyses (followed by the labels used in tables 9, 10, and 11) are:

A. Pretreatment status measures (defined in chapter 2)

1. Lifetime maximum alcohol consumption (LifeAlcUse)
2. Current alcohol consumption in the 2 months prior to admission (CurAlcUse)
3. Lifetime alcohol problems (LifeAlcPr)
4. Current alcohol problems in the 2 months prior to admission (CurAlcPr)
5. Frequency of heroin use in the 2 months prior to admission (Heroin)
6. Number of drugs (other than alcohol) used at all in the 2 months prior to admission (#DrugsUse)
7. Number of drugs (other than alcohol) used regularly in the 2 months prior to admission (#DrugsReg)
8. Lifetime drug problems (DrugProb)
9. Dysphoria, as of the 2 months prior to admission (Dysphoria)
10. Lifetime criminal justice history, based on arrests, convictions, and time spent in prison (CrimHist)
11. Number of months not employed in the 2 years prior to admission (MosUnempl; MosEmploy is used when greater pretreatment employment was associated with poorer outcome status)

B. Other intake variables

1. Sex, entered as a two-point measure, with Male and Female given values of 1 and 2, respectively (Sex)
2. Age (Age)
3. Race, entered as a two-point measure, with Black and Other given values of 1 and 2, respectively; fewer than 3 percent identified themselves as other than black or white, so most of those classed as "Other" were white (Race)
4. Highest grade completed in school (Education)
5. History of disciplinary problems in school, based on report of suspensions, expulsions, and playing hooky (SchDisc)
6. History of hyperactivity in school, based on reports of difficulties in concentration, in sitting still, and talking too much (Hyperact)
7. Parents' socioeconomic status, based on reported occupation of father and/or mother and using the higher status when both were reported (ParSES)
8. Happiness as a child, based on three items: self-rating of happiness, closeness to father, and closeness to mother (HapChild)
9. Report that the subject was abused as a child and/or that someone in the home was violent (Abused)
10. History of complications of drug and/or alcohol use, such as accidental or intentional overdose, bad trips, crash, delerium tremens, hepatitis, or cirrhosis of the liver (Complic)[2]
11. History of psychiatric hopitalization for a period of at least 2 weeks (PsychHosp)
12. Self-report of alienation, based on two correlated subscales, "resistance to authority" and "mistrust" (Alienated)

Tables 9 and 10 summarize the results of seven multiple regression analyses for the EHRC and methadone samples respectively. In these tables, the total variance (i.e., R^2) attributable to the intake measures has been parti-

tioned into three components: (a) that accounted for by intake status on the same criterion as the outcome measure in question, (b) that accounted for by the four intake alcohol measures, and (c) that accounted for by the remaining intake measures. For the outcome measures of alcohol consumption and alcohol problems, (a) and (b) are, of course, the same. In addition, the specific intake measures that best predicted each outcome variable are listed.

Another variable has been added to the intake measures--treatment retention, defined as program completion for EHRC subjects and continuous maintenance for the full year for methadone subjects. Since it occurs after the point of intake, it was taken into the regression equation only after the influence of all 23 intake measures had been extracted.[3] Thus, its $\underline{R}^2$ tells us how much the fact of treatment retention versus dropping out adds to the prediction of outcome once the knowledge of the person obtained on intake has been taken into account.

Tables 9 and 10 summarize a large amount of information and warrant careful study. Rather than repeat in the text what the reader can readily find in the table, we will concentrate on pointing out certain general features, letting the detail emerge from the tables themselves.

EAGLEVILLE SAMPLE

Table 9 shows that in the EHRC sample the 23 intake measures predicted variances ranging from 22 percent to 34 percent, for 6 of the 7 outcome criteria. Employment was the only outcome measure not significantly predicted overall, although both pretreatment employment and the set of "other" intake variables did achieve statistical significance.[4] The average $\underline{R}^2$ for the seven outcome criteria is 26 percent of outcome accounted for, which is a substantial amount considering that treatment and other life experiences that would be expected to affect outcome occur after the time of intake. Most predictable from overall intake measures were the two alcohol measures and criminal justice involvement (30 percent to 34 percent), followed by the drug measures and dysphoria (22 percent to 25 percent).

As for the specific predictors of each outcome measure, we see first that the intake alcohol history predicted only the alcohol outcome measures when we control for other features of the intake interview. Dysphoria, criminal justice involvement, and employment were significantly predicted by the corresponding preadmission history. The two drug outcome measures, drug use and drug problems, were not significantly related to either the drug or alcohol intake history. The alcohol measures explained only 3 percent of the variance in drug use and only 1 percent of the variance in drug problems.

Over the total set of outcome measures, the major weight (about two-thirds, overall) of prediction was carried by the set identified as "other intake measures." For five of the outcome measures, the "other" variables were responsible for by far the majority of variance accounted for. For the remaining two, alcohol problems and criminal justice involvement, they accounted for close to half. The specific variables predictive of each outcome measure are listed and are of interest for further hypothesis development. It should be noted that the preadmission criterion for each aspect of outcome (indicated by being boxed) was the best predictor in the EHRC sample for only one outcome measure and does not appear at all for the two drug outcome measures.

Relationships between stay in treatment and outcome must be cautiously interpreted. It would be jumping to a conclusion to assume that a strong relationship means that staying in treatment was, even in part, responsible for improved outcome; it is entirely possible that poor progress in treatment may lead to premature discharge. Undoubtedly, both phenomena play a part in the relationships between treatment retention and outcome. The improvement in prediction by taking treatment completion into account is, in fact, similar for most outcome measures to that shown in a different form in table 6 (chapter 4).

METHADONE SAMPLE

The results for the methadone sample, shown in table 10, are somewhat different in their patterning. The average proportion of the variance of the seven outcome measures accounted for by the intake interview is somewhat less than in the EHRC sample--21 percent. For methadone subjects, however, the outcome measures are sharply divided into two categories. Three of them (dysphoria and the two alcohol measures) were well predicted by the intake data, with from 28 percent to 31 percent of their outcome variance accounted for. The other four measures were less well predicted by outcome with from 12 percent to 19 percent of outcome variance accounted for.

What is most striking about table 10, in contrast to table 9, is the relative contribution to prediction made by different types of intake variables. As in the EHRC sample, alcohol measures contributed little to explaining

TABLE 9.—Multiple regression analyses of outcome criterion measures with 23 intake measures and treatment retention as predictors for Eagleville sample

	Outcome Criterion Measures = Dependent Variable						
	Alcohol Consumption	Alcohol Problems	Drug Use	Drug Problems	Dysphoria	Criminal Justice Index	Unemployed
N=	161	161	161	161	206	206	206
R^2=Proportion of variance accounted for by:							
Criterion on intake'	.0865***	.1658***	.0051	.0057	.0193*	.1667***	.0415**
Alcohol measures'			.0252	.0122	.0137	.0167	.0172
Other intake measures'	.2317***	.1373***	.2127***	.1973***	.2173***	.1522**	.0836*
Total: 23 intake measures	.3182***	.3031***	.2429*	.2152*	.2503***	.3355***	.1423
Plus treatment retention	.0510***	.0308*	.0147	.0714***	.0048	.1028***	.0508***
Total: 24 measures	.3692***	.3339***	.2576**	.2866***	.2551***	.4383***	.1931*
R with 23 intake measures	.564***	.551***	.493*	.464*	.500***	.579***	.377
R with 23 intake measures plus treatment rentention	.608***	.578***	.508**	.535***	.505***	.662***	.439*
Independent variables contributing most to prediction, in order:[2]	Sex(M) Complic -DrugProb CurAlcPr Alienated -PsychHosp [CurAlcUse]	CurAlcUse [LifeAlcPr] CrimHist [CurAlcPr] Alienated SchDisc	Complic CrimHist Hyperact SchDisc -LifeAlcPr -DrugProb	SchDisc Abused Heroin Hyperact MosEmpl	Complic [Dysphoria] Abused CurAlcPr Hyperact #DrugsUse	[CrimHist] Sex(M) SchDisc Alienated LifeAlcUse Race(B1) -PsychHosp	Educ(Low) [MosUnempl] ParSES(Lo) SchDisc

*p < .05; **p < .01; ***p < .001

[1]While a test of significance is available for the R^2 change produced by a single independent variable at the step when it enters the regression, as well as for the total R^2 produced by the set of independent variables from Step 1 to any point, we do not know of a test for the significance of the R^2 change produced by a nonsequential set of independent variables. Therefore, where the entry in these rows is based on such a set, the p value is that of the single most significant variable in the set. This procedure yields a conservative estimate of the statistical significance of a set of independent variables.

[2]The independent variables listed are those that account for at least 1.7 percent of the variance of the outcome measures for which they are listed. The majority of those listed also added a significant amount of variance at the step when they entered the regression equation. They are listed in the order of magnitude of their contributions to the final regression equation. All labels are oriented so as to indicate the intake status associated with poor outcome status; when necessary, the label is modified to indicate this by a minus sign or other indication. The intake variable(s) corresponding to each outcome measure are enclosed in a box.

NOTE: Listwise deletion was used, so that the analyses included only subjects with no missing data. Some of the items on which intake measures were based were added after the study began; in addition, 10 percent did not report either parent's occupation. As a result, 15 percent of the EHRC subjects and 29 percent of methadone subjects were dropped from the analyses in tables 9, 10, and 11.

TABLE 10.—Multiple regression analyses of outcome criterion measures with 23 intake measures and treatment retention as predictors for methadone sample

	Outcome Criterion Measures = Dependent Variable						
	Alcohol Consumption	Alcohol Problems	Drug Use	Drug Problems	Dysphoria	Criminal Justice Index	Unemployed
N=	330	330	330	330	370	370	370
R^2=Proportion of variance accounted for by:							
Criterion on intake[1]	.2475***	.2537***	.0818***	.0531***	.1897***	.0820***	.1505***
Alcohol measures[1]			.0160*	.0202	.0461***	.0042	.0067
Other intake measures[1]	.0327	.0477**	.0259	.0604*	.0738***	.0790***	.0314
Total: 23 intake measures	.2802***	.3014***	.1237**	.1337**	.3096***	.1652***	.1886***
Plus treatment retention	.0008	.0007	.0335***	.0467***	.0009	.0605***	.0414***
Total: 24 measures	.2810***	.3021***	.1572***	.1804***	.3106***	.2257***	.2300***
R with 23 intake measures	.529***	.549***	.352***	.366**	.556***	.406***	.434***
R with 23 intake measures plus treatment rentention	.530***	.550***	.396***	.425***	.557***	.475***	.480***
Independent variables contributing most to prediction, in order:[2]	CurAlcUse LifeAlcPr	CurAlcPr CurAlcUse LifeAlcPr LifeAlcUse	#DrugsReg #DrugsUse LifeAlcUse	DrugProb Dysphoria Age(Yng)	Dysphoria CurAlcPr MosUnempl LifeAlcUse Sex(F)	CrimHist SchDisc Complic	MosUnempl Sex(F)

*p < .05
**p < .01
***p < .001

[1] While a test of significance is available for the R^2 change produced by a single independent variable at the step when it enters the regression, as well as for the total R^2 produced by the set of independent variables from Step 1 to any point, we do not know of a test for the significance of the R^2 change produced by a nonsequential set of independent variables. Therefore, where the entry in these rows is based on such a set, the p value is that of the single most significant variable in the set. This procedure yields a conservative estimate of the statistical significance of a set of independent variables.

[2] The independent variables listed are those that account for at least 1.7 percent of the variance of the outcome measure for which they are listed. The majority of those listed also added a significant amount of variance at the step when they entered the regression equation. They are listed in the order of magnitude of their contributions to the final regression equation. All labels are oriented so as to indicate the intake status associated with poor outcome status; when necessary, the label is modified to indicate this by a minus sign or other indication. The intake variable(s) corresponding to each outcome measure are enclosed in a box.

variances in drug use and drug problems (2 percent for each). The major contribution to prediction was, for each outcome measure, made by the preadmission variable directly corresponding to it, as can be seen in the listing of independent variables. The "other intake measures" accounted for the minor part of the predicted variance for each outcome measure in marked contrast to what was found in the EHRC sample.

One might wonder why, in both the EHRC and methadone samples, intake information and, in particular, the corresponding pretreatment status, was least able to predict outcomes in regard to drug use and drug problems--the very symptoms for which our subjects entered treatment. The most likely reason is that this population, by definition, consists entirely of people with high levels of drug use and associated problems on intake to treatment. The limited range of pretreatment variation in drug use and problems thus makes it impossible for these measures to predict very much of the substantial variance in drug use and problems that was seen on followup. In contrast, while all of these drug addicts had presenting problems in one or more areas other than their drug abuse, it was not the same area for all. As a result, there was sufficient pretreatment variation in alcohol consumption, alcohol problems, dysphoria, criminal history, and employment to make these useful variables for the prediction of outcome status.

The degree of prediction added by knowledge of treatment retention for methadone subjects reveals a striking relationship not found for EHRC subjects. As regards the three measures of outcome found to be most strongly a function of pretreatment status--alcohol consumption, alcohol problems, and dysphoria--there was no effect attributable to treatment retention whatsoever. Taking into account the overall reduction in dysphoria and, to a lesser extent, alcohol consumption (see table 5, chapter 4), it is possible to predict fairly well at the time of admission to methadone maintenance both the average level of these measures a year later, as well as the relative standing of an individual within the group, without having to know whether or not the client will remain in treatment.

As regards drug use, drug problems, criminal justice involvement, and employment, however, the situation is quite different. These measures were less well predicted from intake measures, and knowledge of treatment retention added significantly to the prediction of outcome, although the contribution of treatment retention in each case was still weaker than that of the intake data. It should be borne in mind, however, that the mere fact of treatment retention is a crude measure of treatment delivered by the program and received by the client for either EHRC or methadone maintenance.

Table 11 examines in more detail two phenomena that were noted in tables 9 and 10, the fact that the set of independent variables described as "other intake measures" accounted for a much greater portion of outcome variance in the EHRC sample than in the methadone sample, and the fact that the corresponding preadmission criterion measure was the best single predictor of each of the seven outcome variables in the methadone sample, while this was the case for only one outcome measure (the criminal justice index) in the EHRC sample. Table 11 is based on the same stepwise multiple regression analyses that are summarized in tables 9 and 10, but groups the 23 intake measures differently so as to address these issues.

The intake variables are divided into four groups: (1) Background, consisting of 10 demographic and early history items (sex, age, race, parents' SES, education, school disciplinary problems, hyperactivity, happiness as a child, history of abuse in childhood, and psychiatric hospitalization); (2) Five measures of drug history and status on intake (drug problems, complications of drug use, frequency of heroin use, number of drugs used, and number of drugs used regularly); (3) Four measures of alcohol history and status on intake (lifetime and current alcohol consumption, lifetime and current alcohol problems); and (4) Four other measures of pretreatment status (criminal history, months of unemployment, dysphoria, and alienation).

The most striking and consistent difference between the EHRC and methadone samples in the predictive power of the four sets of intake variables is that the early background variables played a greater role in the prediction of each outcome variable for EHRC subjects than for methadone subjects, ranging from twice as great to 24 times as great. The specific demographic and early history variables more predictive of outcome among EHRC subjects varied from one outcome measure to another, as can be seen in the lower portion of table 9.

As regards the sets of intake measures representing drug history, alcohol history, and "other status measures," there are no differences between the two treatment samples that are consistent across the seven outcome measures. Each of these three sets of intake measures, however, includes the specific pre-

admission criterion measures for two or more outcome measures. When we examine the specific intake measure or measures corresponding to each outcome measure, as is done in the lower portion of each half of table 11, it is apparent that pretreatment status on each criterion variable predicts outcomes much better for methadone subjects than for EHRC subjects. This is true for all but one of the outcome measures, most strikingly for the two drug measures and for dysphoria. Only for the criminal justice index is the pretreatment history a better predictor among EHRC subjects.

For EHRC subjects, then, knowledge of the patient's demographic characteristics and early history on admission to treatment were especially useful in predicting posttreatment outcomes. Additional analyses, not reported here, show that this is true regardless of whether treatment was completed or not: thus, it is unlikely that this phenomenon is a result of the treatment itself. Rather, the kind of drug addict who chooses or is referred to Eagleville is apparently one whose current problems not only have their roots in the past, but are still very much a function of long-standing, unresolved difficulties. We have seen in chapter 1 that the EHRC sample included a larger proportion of people with histories of social and psychological instability, and it was there suggested that their referral to an intensive residential program was appropriate. These findings confirm that view, by demonstrating that for these drug addicts the effects of their early backgrounds must be overcome before they can be successfully rehabilitated.

Since treatment outcome for the methadone subjects was a function of early background to only a limited extent, treatment that focuses more on the client's current situation and mode of functioning seems more appropriate for these clients. Furthermore, while outcome was more a function of current status, rather than early background, it was not just a continuation of the same behavior. For example, preadmission employment predicted outcome status in regard to alcohol problems, dysphoria, and criminal justice involvement as well as employment, while the criminal justice history predicted alcohol consumption, drug problems, and employment as well as criminal justice involvement. The data may support the view that counseling in methadone programs may be quite effective for many clients by emphasizing present functioning rather than early background dynamics.

What do all these findings about the "prediction" of outcome mean to the clinician? In the case of our sample, or in any of its subgroups, less than 25 percent of outcome variance could have been predicted in advance. But there is another, more important, meaning of these findings for those who provide treatment. Tables 9, 10, and 11 describe pretreatment characteristics of these particular drug addicts that played a part in their treatment outcomes, given the particular treatment that they were offered and able to participate in. Viewed in this way, these findings can be used to improve treatment by helping us to understand certain differences between treatment populations in the ways they can best be helped.

In a very real sense, the ideal toward which we aspire in designing treatment programs is to reduce the $\underline{R}$ between intake and outcome variables to zero. This would be the case if it were possible, for each individual who comes to us for help, to achieve successful rehabilitation regardless of his or her past. What we have learned from the multiple regression analyses is that this ideal can be approached only by understanding the part played by the distant or recent past, and by subsequent treatment.

It might seem from tables 9 and 10 that treatment made little difference in outcome, compared with pretreatment characteristics. As has been noted, however, the mere fact of treatment retention provides only a crude and very limited picture of the impact of treatment. In spite of this, for both the EHRC and methadone samples, treatment retention accounted for a significant amount of the variance in several outcome measures over and above that accounted for by intake information, adding as much as a third again to the predictive power of the intake interview. Treatment does indeed make a difference in outcome, and the full extent of that difference can be gauged only by a more detailed look at in-treatment variables than is possible in this report.

A final question could be asked, namely, do these findings have anything to add to our understanding of alcohol abuse in drug addicts, or are they merely an interesting by-product of the study? A consideration of many aspects of the intake interview not only broadens our understanding of the factors associated with good or poor treatment outcomes in different areas of functioning, but enables us to identify which of the relationships previously seen between the alcohol history and outcome measures are the product of the alcohol history itself and which are produced by other factors. The result has been to verify most of the findings presented in previous chapters.

TABLE 11.—Multiple regression analyses of outcome criterion measures with 23 intake measures as predictors for Eagleville and methadone samples

	Outcome Criterion Measures = Dependent Variables							
	Alcohol Consumption	Alcohol Problems	Drug Use	Drug Problems	Dysphoria	Criminal Justice Index	Unemployment	Mean of 7 Outcome Measures
Eagleville Subjects N=	161	161	161	161	206	206	206	
Multiple R	.564***	.551***	.493*	.464*	.500***	.579***	.377	.504
R^2=Proportion of variance accounted for	.3182	.3031	.2429	.2152	.2503	.3355	.1423	.2582
Proportion of variance accounted for by:								
Background	.1580	.0361	.0906	.1270	.0972	.0984	.0643	.0959
Drug history	.0509	.0324	.0920	.0409	.1165	.0205	.0176	.0530
Alcohol history	.0865	.1658	.0251	.0122	.0137	.0167	.0172	.0482
Other status measures	.0229	.0689	.0352	.0351	.0229	.0999	.0432	.0611
Total	.3182	.3031	.2429	.2152	.2503	.3355	.1423	.2582
Proportion of variance accounted for by corresponding intake variable(s)	.0616	.1424	.0051	.0057	.0193	.1667	.0415	.0632
Methadone Subjects N=	330	330	330	330	370	370	370	
Multiple R	.529***	.549***	.352**	.366**	.556***	.406***	.434***	.456
R^2=Proportion of variance accounted for	.2802	.3014	.1237	.1337	.3096	.1652	.1886	.2146
Proportion of the variance accounted for by:								
Background	.0065	.0115	.0088	.0235	.0387	.0502	.0164	.0224
Drug history	.0075	.0089	.0840	.0662	.0038	.0244	.0078	.0289
Alcohol history	.2475	.2537	.0160	.0202	.0461	.0042	.0067	.0849
Other status measures	.0187	.0273	.0149	.0238	.2200	.0864	.1577	.0784
Total	.2802	.3014	.1237	.1337	.3096	.1652	.1886	.2146
Proportion of the variance accounted for by corresponding intake variable(s)	.2440	.2225	.0818	.0531	.1897	.0820	.1505	.1462

*p < .05; **p < .01; ***p < .001 (two-tailed)

7. Summary and Implications

The research reported here developed out of a concern, both clinical and theoretical, with the issue of alcohol abuse among drug addicts.

In this study two related but distinct dimensions of alcohol abuse were operationally defined--alcohol consumption and alcohol-related problems--and tested predictions specific to each dimension.

ALCOHOL ABUSE--PREVALENCE AND VALUE FOR DIAGNOSIS

The first question addressed was that of the prevalence of alcohol abuse among drug addicts. The data confirm that it is indeed prevalent. Using criteria based on a previous treatment population of seriously advanced alcoholics, it was found that 50 percent of the drug addicts in this study sample had consumed excessive quantities of alcohol at some time in their lives, and 25 percent reported that they had experienced a significant number of alcohol-related problems, i.e., symptoms of alcoholism. The criteria used were stringent, so this must be considered a minimal estimate of the prevalence of problem-drinking histories in this population. For example, fully half of the sample reported having had more than one symptom of alcoholism at some time in their lives. In the 2 months before they were admitted to treatment for drug abuse, 25 percent had been drinking heavily, and 14 percent reported a significant number of alcohol-related problems, based on the same stringent criteria. A year later, taking the sample as a whole, the prevalence of heavy drinking and of problem drinking were about the same as before treatment.

Given the fact that alcohol abuse is frequently seen in patients coming to treatment for drug abuse, what are the diagnostic and prognostic implications of either active alcohol abuse or a past history of alcohol abuse? The diagnostic issue was addressed by a thorough examination of other features of the intake history. This revealed that those with a history of problem drinking (i.e., a high level of alcohol-related problems) reported significantly more pathological histories than did other subjects. Their histories were characterized by early trauma, behavioral and emotional disturbance going back to childhood, and antisocial or asocial behavior in the more recent past. Anxiety, depression, and suicidal trends were prominent, and their drug use was based more on psychological needs than was the case with other addicts.

Clearly, a history of problem drinking in a drug addict must be considered a diagnostic indicator that the patient has special treatment needs. These pathological histories identified above, particularly those relating to early experiences, were associated primarily with histories of problem drinking, and not with histories of heavy drinking, per se, in the absence of such problems.

ALCOHOL ABUSE AND OUTCOME--THE HYPOTHESES

The prognostic implications of a history of alcohol abuse obtained on admission to treatment, as well as the relationships between alcohol abuse at the time of followup and other aspects of rehabilitation observed at the same time, are addressed in the hypotheses and the predictions based on them. Table 12 shows which predictions were confirmed at the .05 level of probability (two-tailed) and which were not.

Hypothesis I and the predictions stemming from it are concerned with relationships between alcohol abuse and other aspects of the person's condition occurring at the same time, a year after admission to treatment for drug abuse. Prediction 1 was that problem drinking (i.e., a high level of alcohol-related problems) would be associated with poor rehabilitation in other areas, while Prediction 2 was that heavy drinking would be associated with poor rehabilitation even after the outcomes of problem drinkers have been taken into account.

Prediction 1 was strongly confirmed: Problem drinkers had poorer outcomes in all five of the nondrinking measures for the total sample and for at least one of the modalities sampled; for three of the five measures the prediction was confirmed among both EHRC and methadone subjects. Prediction 2, however, was not confirmed, except that heavy drinkers without significant alcohol-related problems had poorer outcomes than moderate drinkers and abstainers in regard to nonnarcotic drug use, and even that relationship failed to reach statistical significance in the methadone sample.

Thus, with one minor exception, in assessing different aspects of the person's functioning a year after admission to treatment, we find that problem drinking was associated with generally poor status, while heavy drinking in itself was not.

Hypothesis II covers a substantial span of time, in that it is concerned with the ability of a history of alcohol abuse obtained on intake to treatment to predict outcomes a year

TABLE 12.—Summary of findings for each hypothesis and predicted relationship

	Predictions Confirmed ($p < .05$)	Predictions Not Confirmed ($p > .05$)
HYPOTHESIS I:		
Prediction 1: Problem drinkers at followup will have poorer outcomes than others	a. Drug Use b. Drug Problems c. Dysphoria (MM,All) d. Crim. Justice e. Employment (EH,All)	c. Dysphoria (EH;$p < .10$) e. Employment (MM)
Prediction 2: Heavy drinkers without problems at followup will have poorer outcomes than those not heavy drinkers	a. Drug Use (EH,All)	a. Drug Use (MM;$p < .10$) b. Drug Problems c. Dysphoria d. Crim. Justice e. Employment
HYPOTHESIS II:		
Prediction 3: Subjects with a history of problem drinking will have poorer outcomes than others	a. Alcohol Consumption b. Alcohol Problems c. Drug Use (MM) d. Drug Problems (MM,All) e. Dysphoria (MM,All) f. Crim. Justice (EH,All)	c. Drug Use (EH,All) d. Drug Problems (EH) e. Dysphoria (EH) f. Crim. Justice (MM) g. Employment
Prediction 4: Current problem drinkers on intake will have poorer outcomes than past problem drinkers	a. Alcohol Consumption b. Alcohol Problems	c. Drug Use d. Drug Problems e. Dysphoria f. Crim. Justice g. Employment
Prediction 5: Subjects with a history of heavy drinking but not problem drinking will have poorer outcomes than those with a history of neither	a. Alcohol Consumption (MM,All) b. Alcohol Problems (MM,All) c. Drug Use (All) d. Drug Problems (All) e. Dysphoria (MM)	a. Alcohol Consumption (EH;$p < .10$) b. Alcohol Problems (EH) c. Drug Use (EH,$p < .10$; MM,$p < .10$) d. Drug Problems (EH;MM, $p < .10$) e. Dysphoria (EH;All,$p < .10$) f. Crim. Justice g. Employment

TABLE 12.—Summary of findings for each hypothesis and predicted relationship—Continued

	Predictions Confirmed ($p < .05$)	Predictions Not Confirmed ($p > .05$)
Prediction 6: Current heavy drinkers on intake will have poorer outcomes than past heavy drinkers	a. Alcohol Consumption (MM,All) b. Alcohol Problems (MM,All)	a. Alcohol Consumption (EH) b. Alcohol Problems (EH) c. Drug Use d. Drug Problems e. Dysphoria f. Crim. Justice g. Employment

NOTE: Entries in parentheses--EH, MM, and/or All--specify that a given prediction was (or was not) confirmed for the Eagleville, methadone, or total samples. Where there is no such entry, the findings were the same for each group and for the total sample. While a two-tailed $p < .05$ was required for confirmation, p values at the .10 level are cited in the "not confirmed" column.

later. Prediction 3 predicts poorer outcomes among those with a history of problem drinking, and Prediction 5 predicts poorer outcomes for heavy drinkers after the effect of problem drinking has been taken into account. Predictions 4 and 6 are concerned with the difference between the lifetime and recent alcohol histories.

Prediction 3 was confirmed to a substantial degree: A pretreatment lifetime history of problem drinking did predict less successful rehabilitation a year after admission to treatment. As might be expected, it predicted both heavy drinking and problem drinking most strongly, exceeding the .001 level of probability in both the EHRC and methadone samples separately. Problem drinkers also had poorer outcomes in four of the five non-drinking measures, but at a statistically significant level for only one of the treatment modalities in each case. Methadone subjects with a history of problem drinking reported significantly more drug use, drug problems, and dysphoria on followup than did other methadone subjects. EHRC subjects with a history of problem drinking reported significantly more involvement with the criminal justice system during the year of followup than did other EHRC subjects. Employment was the only outcome measure unrelated to the pretreatment problem drinking history.

When those with a history of problem drinking are removed from the analysis, does a lifetime history of heavy drinking in itself portend poor outcomes? Prediction 5 received some confirmation, but at a weaker level than Prediction 3. Among methadone subjects, heavy drinking in the absence of a significant level of alcohol-related problems was associated with alcohol consumption, alcohol problems, and dysphoria on followup. Differences in these outcome measures among EHRC subjects were smaller and did not reach statistical significance. Drug use and drug problems were also more prevalent among those with a history of heavy drinking than among moderate drinkers and abstainers, but these differences reach statistical significance only when the EHRC and methadone samples are combined. Neither criminal justice involvement nor employment on followup was related to a history of heavy drinking, per se.

Predictions 4 and 6 are concerned with the distinction between past and current problem drinking and heavy drinking. It should be noted that the comparisons required to test these predictions are made a fortiori. With regard to problem drinking, the major set of predictions, those under Prediction 3, are tested by comparing Types I, II, and VII with Types III, IV, V, and VI of the intake drinking history typology. Confirmation of Prediction 4 then requires a statistically significant difference between Types I and II, two types already above average in the prevalence of poor outcomes. In the same way, Prediction 5 was tested by comparing Types III and IV (already losing the heavy drinkers in Types I and II from the analysis) with

Types V and VI; Prediction 6 is then based on differences between Types III and IV.

Thus, the predictions regarding past versus current alcohol abuse histories on intake have to do with a narrower range of differences in a reduced number of subjects. Prediction 4 was confirmed, and that very strongly ($p < .001$), only with regard to the two drinking outcome measures, alcohol consumption and alcohol problems. Prediction 6, that current heavy drinking with no history of problems is more of a negative indicator than past heavy drinking, was confirmed at an acceptable level of probability only for methadone subjects, and only in regard to alcohol consumption and problems at followup. Differences among EHRC subjects were of similar magnitude but not statistically significant because of the smaller number of cases.

A history of alcohol abuse was thus found to be associated with poor outcomes on followup for both the EHRC and methadone samples. There were, however, some differences in the types of poor outcomes most strongly associated with problem drinking in the two treatment samples, as can be seen in table 12. Involvement with the criminal justice system was more strongly related to problem drinking among EHRC subjects. This was true with regard to problem drinking on followup as well as that prior to treatment. Dysphoria at the time of followup was strongly related to both past and contemporaneous alcohol abuse only for methadone subjects. Furthermore, it was only in the methadone sample that a pretreatment history of problem drinking was related to levels of drug use and drug-related problems on followup, and pretreatment heavy drinking by itself predicted both alcohol consumption and alcohol-related problems on followup. Thus, the implications of alcohol abuse and its effect on outcome appear to be somewhat different for the EHRC and methadone groups in the details, but they are clearly negative for both groups.

To summarize these findings: Poor treatment outcome was most strongly associated with problem drinking at the time of followup, next with problem drinking current at intake, then with a history of problem drinking in the past. As for heavy drinking without reported alcohol problems, a curious reversal of expectation was found. Heavy drinking at the time of followup was not associated with poor outcomes in aspects of functioning other than alcohol use and abuse, while pretreatment heavy drinking did predict poor treatment outcome.

It appears that alcohol-related problems experienced by about half of the heavy drinking drug addicts result in more pervasive difficulties than does heavy drinking in and of itself. In this treatment population, however, heavy drinking at one point in time had a high probability of becoming problem drinking at a later time. If it does, and only if it does, a general failure of rehabilitation is likely.

It should be noted that both of the treatment modalities sampled achieved their primary goal of reducing drug abuse. Furthermore, better outcomes were found in those who remained in treatment longer. Contrary to what one might expect, those with a history of problem drinking were no less likely to remain in treatment. Thus, treatment retention and problem drinking are independent predictors of outcome.

THE PREDICTORS OF OUTCOME IN TWO TREATMENT SAMPLES

The next two issues raised at the end of chapter 1 had to do with the predictors of outcome and possible differences between the two treatment modalities from which our subjects were drawn. The multiple regression analyses in chapter 6 provided some interesting and suggestive information about the pretreatment predictors of outcome. A major finding was that use of alcohol intake measures provided little explanation of outcome variance regarding drug use on followup.

DOES METHADONE MAINTENANCE LEAD TO ALCOHOL ABUSE?

The increasing recognition in recent years of a serious alcohol abuse problem among methadone-treated drug addicts has suggested to some the possibility that methadone itself in some way leads to problem drinking, that is, creates alcohol abuse in drug addicts who had not previously had a drinking problem.

The findings of this study make it quite clear that this is not generally the case, although we cannot rule out the possibility that it may occur in rare instances.[3] Most of the methadone clients who had a drinking problem a year after admission to treatment had had such a problem before beginning treatment (as was the case with the EHRC sample). Overall, there was no increase in problem drinking. Furthermore, those who remained on methadone maintenance the entire year were no more likely to have a drinking problem on followup than were those who received methadone for a shorter time. Such a difference would be expected if the methadone were responsible for the drinking. While a small, though appreciable, minority (18 percent) of those who claimed on intake that they had never drunk excessively or had any problems

with alcohol did report excessive drinking on followup, the rate was the same for EHRC as for methadone subjects.

Our data show that the strongest rehabilitative effects of 1 year of methadone maintenance were in control of narcotic abuse and improved employment. The data point up the need for methadone programs to be aware of the potential of the alcohol abuse problem in patient populations and consider methods of addressing this problem.

WHAT DOES ALCOHOL ABUSE MEAN IN A DRUG ABUSER?

The findings of this study indicate that excessive alcohol consumption and problems symptomatic of alcohol abuse are prevalent in drug treatment populations. The prevalence of problem drinking in this population was high in comparison to the general population (Cahalan 1970; Barr et al. 1974). Prevalence was high at three points in time--before their addiction to drugs, at the time they entered treatment for drug abuse, and 1 year later.

If one's focus is on the presenting problem of drug abuse, problem drinking may be seen as a complicating problem that must be considered in planning an individual's treatment. The findings confirm the hypothesis that the drug addict with a complicating drinking problem is more difficult to rehabilitate. Problem drinking that is active on admission to treatment for the drug problem is the poorest prognostic sign (or poses the greatest treatment difficulties). Problem drinking in the past history that is not currently active on intake is less of an interference with treatment, but should also be a matter of concern.

In viewing the person's total substance abuse history, problem drinking by drug addicts is the most common type of multiple substance abuse that has been identified in this sample. The findings show that problem drinking drug abusers are more deeply disturbed, and their disturbance can be traced to the earlier periods of life. The involvement of these drug abusers with alcohol is not just another aspect of their substance abuse, but a possible indication of serious and pervasive underlying disturbance. Excessive alcohol consumption coupled with alcohol-related problems, including loss of control over drinking, was found to have more serious implications than excessive consumption without the associated problems. From this broader viewpoint, it is not the problem drinking as such that interferes with treatment, but the underlying pathology that is responsible for both the problem drinking and the treatment difficulties.

This study did not base the identification of problem drinking on the mere consumption of alcohol, but on the existence of alcohol-related problems as well. It was thus possible to differentiate among problem drinkers, heavy drinkers without reported problems, and moderate drinkers or abstainers. The data provide the basis for the same type of analysis of drug abuse, since not only use of drugs, but associated problems and psychological motivations for use were studied as well. These distinctions used in this study should be applied to the abuse of all substances. In this way it will be possible to investigate the relationship between the use and abuse of specific substances, rather than accepting unthinkingly a legal or other definition of drug use as necessarily constituting drug abuse.

The fact that drinking and associated symptoms vary widely among drug addicts enhances the value of the alcohol history as a diagnostic tool. The level of pretreatment heroin use, in contrast to alcohol use, varied little among subjects within this treatment population, and the slight differences that did exist did not predict differences in treatment outcome. Furthermore, pretreatment differences among subjects in their use of sedatives, amphetamines, cocaine, marihuana, and tranquilizers also did not predict differences in rehabilitation on followup.

Thus, alcohol abuse can be a highly meaningful and clinically useful indicator of pervasive problems and special treatment needs of drug clients.

RECOMMENDATIONS FOR TREATMENT

The most obvious recommendation based on the findings of this study is that treatment programs provide a thorough assessment of each prospective patient before a treatment plan is established. Clients at high risk of manifesting drinking problems during and after treatment can be identified at intake in most cases if the proper questions are asked. The intake history must cover not only the consumption of alcohol, but motives for drinking, gains obtained from alcohol, loss of control over drinking, psychological and physiological bad effects from alcohol, and consequences in the person's life of his drinking. It is necessary to ascertain what alcohol does for and to the person.

Inquiry should be made about drugs as well as alcohol, and about many other features of the person's history and current functioning. The data show that depression and criminality are of special diagnostic significance in treatment planning. Since there is a high

incidence of depression and suicide in this population, it is essential to identify these problems.

Since alcohol abuse on followup is the aspect of outcome most predictable from the intake alcohol history, it is usually possible to identify the patients who most need to be watched for the development of this complicating problem. Future problem drinking among drug addicts is predicted not only by a past history of problem drinking, but by a history of excessive alcohol consumption as well, even when associated problems have been denied.

In reviewing the intake characteristics of the methadone clients who were in drug-free programs at 1 year and the Eagleville ex-residents who were on methadone maintenance at 1 year, one is struck by the fact that these special subgroups within each treatment modality sample were more like the typical patient in the modality they were in at followup than the typical patient in the modality they first entered. It seems likely that at least some of these individuals would have been more appropriately referred in the first place if (a) a more thorough assessment of their needs had been made at intake and (b) a wider choice of treatment modalities had been available to them. The data suggest that the needs of the drug addict with a history of problem drinking, as well as the drug addict who is anxious, depressed, or suicidal, may be better met by a comprehensive form of treatment.

FOOTNOTES

CHAPTER 1

[1]We wish to express our gratitude for the cooperation of the following methadone treatment programs: Mantua Halfway House; Philadelphia Drug Treatment Center; North Central Drug Abuse Program; St. Luke's Helen Goldman Clinic; Philadelphia Veterans Administration and Model Cities, in Philadelphia; the Montgomery County Methadone Clinic in Norristown, Pa.; the Crozer-Chester Medical Center-Methadone Clinic in Chester, Pa.; and Mercer County and Camden County Clinics in New Jersey.

[2]The seeming discrepancy between the 27 percent never convicted and only 21 percent never in prison stems from the fact that 6 percent had spent time in prison following arrest but were not subsequently convicted of an offense.

[3]In addition, two-thirds of the sample were sought for interviews during the year, at 2 and 7 months after admission, and a one-fifth stratified sample of the total study sample was interviewed 18 months after admission. These data are not reported here.

[4]Urines were tested for alcohol by headspace gas chromatography. Testing for different drugs was by fluorescence spectrophotometry, gas chromatography, and microchemical spot tests. The results of the urine tests by and large confirmed the subject's own reports and so will not be reported here.

CHAPTER 2

[1]The actual transformation was to add .06 to each alcohol consumption score, and then take the logarithm (base 10) of the resulting number. The constant was added in order to reduce the number of categories at the low end of the scale; it had little effect on high scores.

[2]It would have been desirable to differentiate between lifetime and current drug-related problems as well, but that distinction was foregone because of the extreme length of the intake interview. The possibly dubious assumption was made that since subjects were entering treatment for drug abuse, most of the drug-related problems would be currently active.

[3]In retrospect, the single item about intoxication should have been omitted, since it gives undue weight to a single item, and there are no parallel items for drug use. The findings would not have been different however, since statistical analysis shows that the correlation between the Alcohol Problem Score with and without this item is .98.

[4]The r's between paired Motivation for Use and Problems scores were: for alcohol, pretreatment (using Lifetime Problems) it was .70; for alcohol on followup it was .66; for drugs pretreatment it was .35; for drugs on followup it was .67. In regard to pretreatment drug use, scores piled up at the upper limit of both scales, thus restricting the range of possible variation and thereby reducing the correlation between them.

[5]While 243 alcoholics were interviewed, 15 did not provide complete data. As a result, N was reduced to 228 for these comparisons.

[6]The relationships between problem drinking and heavy drinking, both past and current, as assessed on intake will be presented in chapter 3; the followup relationships will be presented in chapter 4.

[7]Of the original list, substances not incorporated into the six drug categories are: legal methadone, alcohol (better measured by other items) and, because they were scarcely used by this sample, hallucinogens, inhalants, and over-the-counter preparations.

[8]In order to assess pre-post change, an intake Drug Use Index was computed in the same way, except that information about prescribed use was not available. See table 5, p. 23.

CHAPTER 4

[1]An additional 8 percent were discharged as "treatment completed," and might have been included in this group. Since criteria vary from program to program, and are often difficult to ascertain, it was decided to use the unequivocal criterion of continuous treatment.

[2]It may be noted that examination of the data for current problems on intake shows that those with scores of two or more had significantly poorer outcomes than those with only one or none, so the criterion of three (rather than five, as in the intake typology) is not too low.

CHAPTER 5

[1]This interpretation is supported by the fact that dysphoria on followup is associated primarily with the use of tranquilizers, sedatives, and narcotics.

[2]Although moderate drinkers and abstainers were differentiated in the analyses of data, they did not differ in treatment outcome, except for outcome alcohol measures, on which both nevertheless had much lower scores than did the preadmission problem drinkers and heavy drinkers.

CHAPTER 6

[1]Among the intake variables considered were the frequency of use in the 2 months preadmission of each drug category. Whatever ability the drug frequency scores had to predict outcome was better accounted for by #DrugsUse and #DrugsReg, which are described further in the text. Frequency of heroin use was nevertheless included in the analysis because of its special importance, but did not turn out to improve prediction of outcome significantly.

[2]Four of these complications are primarily consequences of drug abuse (accidental overdose, bad trip, hepatitis, and crash); this was verified by the fact that the drug addicts were more than three times as likely to report them as were the alcoholics. Two (delerium tremens and cirrhosis of the liver) are symptoms of alcoholism; alcoholics were over eight times as likely to report them as were drug addicts. Intentional overdose was reported equally often by both addiction groups. The two alcoholic symptoms constituted only 3 percent of all complications reported by the drug addicts, so it is safe to consider the Complic Score as representing complications of drug abuse for this sample. The percentages of drug addicts reporting each complication were, in order of magnitude: accidental overdose (41 percent of subjects), hepatitis (28 percent), crash (26 percent), bad trip (16 percent), deliberate overdose (7 percent), delerium tremens (2 percent), and cirrhosis (2 percent).

[3]In stepwise multiple regression analysis, one may specify the order in which variables are to be taken. This may be done for various purposes, e.g., to give primacy to certain variables or, as in this case, to reflect the actual sequence of events.

[4]This apparent inconsistency occurs because the criteria for statistical significance increase sharply as the number of predictor variables is increased.

CHAPTER 7

[1]The entries in table 12 are all based on t-test comparisons of the appropriate groups from the intake and followup drinking typologies. Space did not permit inclusion of all of these analyses in the text; analyses bearing on the predictions were presented in figure 4, and in tables 7, 8, and 9.

[2]It is also possible that a 1-year period of followup is too short to observe the effects of methadone on alcohol use and abuse. We have not, however, identified any significant number of cases manifesting the rapid onset of alcoholism in methadone clients described by Bihari (1974). A recent report by Gearing et al. (1976) found the reverse to be the case, that is, that previously reported alcohol problems tended to disappear in patients who remained on methadone maintenance for 4 or more years.

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APPENDIX
Psychology of Substance Use Scales

HOW THE SCALES WERE DEVELOPED

A set of 65 items was asked, dealing with reasons for using, behavior associated with use, bad effects experienced, good effects, and consequences in the person's life of his/her substance use. The items were asked separately in regard to the use of alcohol and the use of other drugs. When a positive response occurred, the subject was asked to specify the drug with which the effect had been experienced, as well as whether it was associated with drug use or with withdrawal. The sample included both subjects with a primary diagnosis of drug abuse (85 percent of whom were primarily addicted to narcotics) and subjects with a primary diagnosis of alcoholism. There were thus four sets of responses, each of which was subjected to a separate factor analysis. The four data sets were: responses of drug addicts to drug items (N=851), responses of drug addicts to alcohol items (N=656 who used alcohol), responses of alcoholics to alcohol (N=236), and responses of alcoholics to drug items (N=100 who reported some illicit drug use).

The four factor analyses yielded similar sets of factors. An Index of Similarity was used that is analagous to a Pearson product-moment r, with a range from -1.00 to +1.00 and .00 indicating no similarity. Thus, a high absolute value for the index between two factors from different sets of data means that the same factor, or a very similar pair of factors, has appeared in the two sets (a value of -1.00 means merely that the sign of one is reversed).

The results are clearest when the analyses concerned with each subject's primary substance of abuse is compared, that is, alcoholics talking about their drinking and drug addicts talking about their drug use. Of 13 factors that appeared in each of these two analyses, 11 could be paired across data sets. The 11 indices ranged from .739 to .920, with a mean of .895 and a median of .871. The two analyses of cross-use data (i.e., alcoholics about drugs, drug addicts about drinking) show similar factors, but less clearly differentiated. As a result, fewer factors were obtained (10 and 9 factors, respectively) and they were more highly intercorrelated. They were, however, similar to those obtained in regard to the primary substance of abuse.

The 11 factors that were found for both drug addicts and alcoholics in regard to the primary substance of abuse form the basis for the following scales. Some of these factors (such as Scale A, Social Reasons for Use) were relatively independent of the others. Some factors were, however, substantially intercorrelated, and these are presented both as separate subscales and as components of a larger scale consisting of the intercorrelated subscales and additional items that loaded across several of the component subscales and so could not be unequivocally placed in any one subscale. Scale B, Motivations for Drug Use, is an example of this. Subscales B-1, B-2, and B-3 were distinct but intercorrelated. In addition, four items, e.g., "It helps cheer me up when I'm in a bad mood," had substantial loadings with more than one subscale and so belong in the combined scale.

The Alcohol Problems Score used in this study is based on four measures: Scale C, Loss of Control Over Alcohol Use; Scale D, Bad Reactions to Alcohol; Scale E, Life Consequences of Alcohol Use;[1] and the response to the question "How many times have you stayed intoxicated for a full day or more?" The average intercorrelation of these four measures was .70. Each was converted to a four- or five-point scale, ranging from 0 to 3, or 0 to 4. They were then summed, so that the range of Alcohol Problems Score is from 0 to 13. The Drug Problems Score was obtained in the same manner, with the omission of the question about intoxication.

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[1] Scale E-2, Marital Problems, was omitted, since fewer than half of the subjects had ever been married. Scale E was therefore reduced from 10 to 7 items.

For clinical purposes, a shorter scale with simpler scoring is more useful than the one developed for this research project. This is presented following the scales used in this study.

Scale A. Social Reasons for Use (four items)

to be sociable
because people I know use it
to celebrate special occasions
because on certain occasions this is the thing to do

Scale B. Motivations for Alcohol or Drug Use

(18 items=4 general items plus 3 subscales)

Reason:

it helps cheer me up when I'm in a bad mood
I need it when tense and nervous

Good Effect:

free from worries
that drinking (using drugs) helps you to have fun

Scale B-1. Using to Forget (3 items)

Reason:

when I want to forget something it helps me to forget my worries

Good Effect:

that drinking (using drugs) helps you to forget

Scale B-2. Feelings of Improved Social and Mental Competence (7 items)

Reason:

it helps me to relate to people better
it helps my mind to work better

Good Effect:

felt that drinking (drugs) help(s) you overcome shyness
that drinking (drugs) help(s) you to relax socially
that drinking (drugs) help(s) you to express your ideas and opinions
that drinking (drugs) help(s) you to be more alert mentally

Scale B-3. Relief from Dysphoria (4 items)

Good Effect:

especially good or happy
relaxed, calm
relieved of pain
that drinking (using drugs) relieves tensions

Scale C. Loss of Control Over Alcohol or Drug Use (4 items)

Have you ever tried to cut down or quit but failed?
Have you ever kept on drinking (using) after you had promised yourself not to?
Have you ever worried a lot about your drinking (drug use)?
Have you ever found that once you started it was hard to stop before you got high?

Scale D. Bad Reactions to Alcohol or Drugs (11 items=2 general items plus 3 subscales)

Have you ever lost control of your emotions due to drinking (using drugs)?
Have you ever had convulsions, fits (seizures) (from drugs)?

Scale D-1. Dysphoric Reactions to Alcohol or Drugs (4 items)

Have you ever felt tense, nervous, or anxious?
Have you ever felt depressed, worthless?
Have you ever felt angry or cross?
Have you ever gotten into quarrels or fights with people?

Scale D-2. Visual Distortions from Alcohol or Drugs (2 items)

Have objects or people ever appeared distorted or different in some way from the way you know they really look?
Have you ever seen, heard, or felt things that you knew were not there?

Scale D-3. Psychophysiological Effects of Alcohol or Drugs (3 items)

Have you ever had memory lapses or "blackouts" from drinking (drugs)?
Have you ever had the "shakes"?
Have you ever had trembling hands, so that it was hard to shave or tie your shoes?

Scale E. Life Consequences of Alcohol or Drug Use (10 items=1 general plus 3 subscales)

Have you had problems with other relatives (other than spouse) because of your drinking (drug use)?

Scale E-1. Job and School Problems (4 items)

Have you ever drunk (used drugs) on the job or in other normal activities, e.g., school?
Have you ever been high or tight on alcohol (or drugs) at work or in school?
Have you ever missed work when drinking (using)?
Have you ever had trouble on a job because of drinking (drugs), including losing a job or quitting?

Scale E-2. Marital Problems (3 items)

Has your spouse ever left you or threatened to because of drinking (drugs)?
Has your spouse ever shown concern over your drinking (drug use), or suggested stopping or cutting down?
Has drinking (have drugs) harmed your marriage?

Scale E-3. Problems in Social Relationships (2 items)

Has drinking (have drugs) ever been involved in your losing a friendship?
Has drinking (have drugs) interfered with your social life?

RECOMMENDED SHORT SCALE FOR CLINICAL USE

The Alcohol Problems Score used in this study is based on 23 items, and they were given different weights. For practical use in treatment settings, it is desirable to have a simpler scale, so the 23 items were reanalyzed, assigning equal weights to each.

The item analysis was based solely on the responses of the 866 drug addicts in the main study sample to the questions concerned with alcohol use and its effects, since its goal was to produce a scale suitable for assessing alcohol-related problems in clients with a primary diagnosis of drug abuse.

1. Have you kept on drinking after you had promised yourself not to?
2. Have you found that once you started it was hard to stop before you got high?
3. Have you had the "shakes" from drinking?
4. Have you had trembling hands from drinking, so that it was hard to shave or tie your shoes?
5. Have you felt tense, nervous, or anxious from drinking?
6. Have you felt depressed or worthless when drinking?
7. Have you felt angry or cross when drinking?
8. Have you missed work when drinking?
9. Have you had trouble on a job because of drinking, including losing a job or quitting?
10. Have you had problems with relatives (including spouse, if married) because of your drinking?[2]
11. Has drinking been involved in your losing a friendship?
12. Has drinking interfered with your social life?

The resulting scale has, for lifetime alcohol problems in the present sample of drug addicts, a mean of 1.98, a standard deviation of 3.23, and a reliability coefficient of .923. If subjects who reported lifetime abstinence are omitted, the mean for the drug addicts who reported some alcohol use was 2.56, with a standard deviation of 3.48, and a reliability coefficient of .914. For comparison, within the sample of alcoholics, the mean (for lifetime alcohol problems) was 9.08, with a standard deviation of 2.88, and the reliability coefficient was .811.

This analysis was based on questioning oriented toward the entire lifetime history. It is recommended that for each item producing a positive response, the subject then be asked "Has this happened in the last 2 months?" In this way, two scores will be obtained, for lifetime problems and for current problems, making the inquiry more useful clinically.

For the Lifetime Problems Score, a positive response to four or more items should be a matter of concern, and eight or more positive responses strongly suggest a history of alcoholism. As regards current problems, two or more positive responses suggest the presence of problem drinking, and seven or more suggest active alcoholism.

[2] Item 10 was modified to include spouse among relatives, since the items limited to marital problems have been dropped.

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